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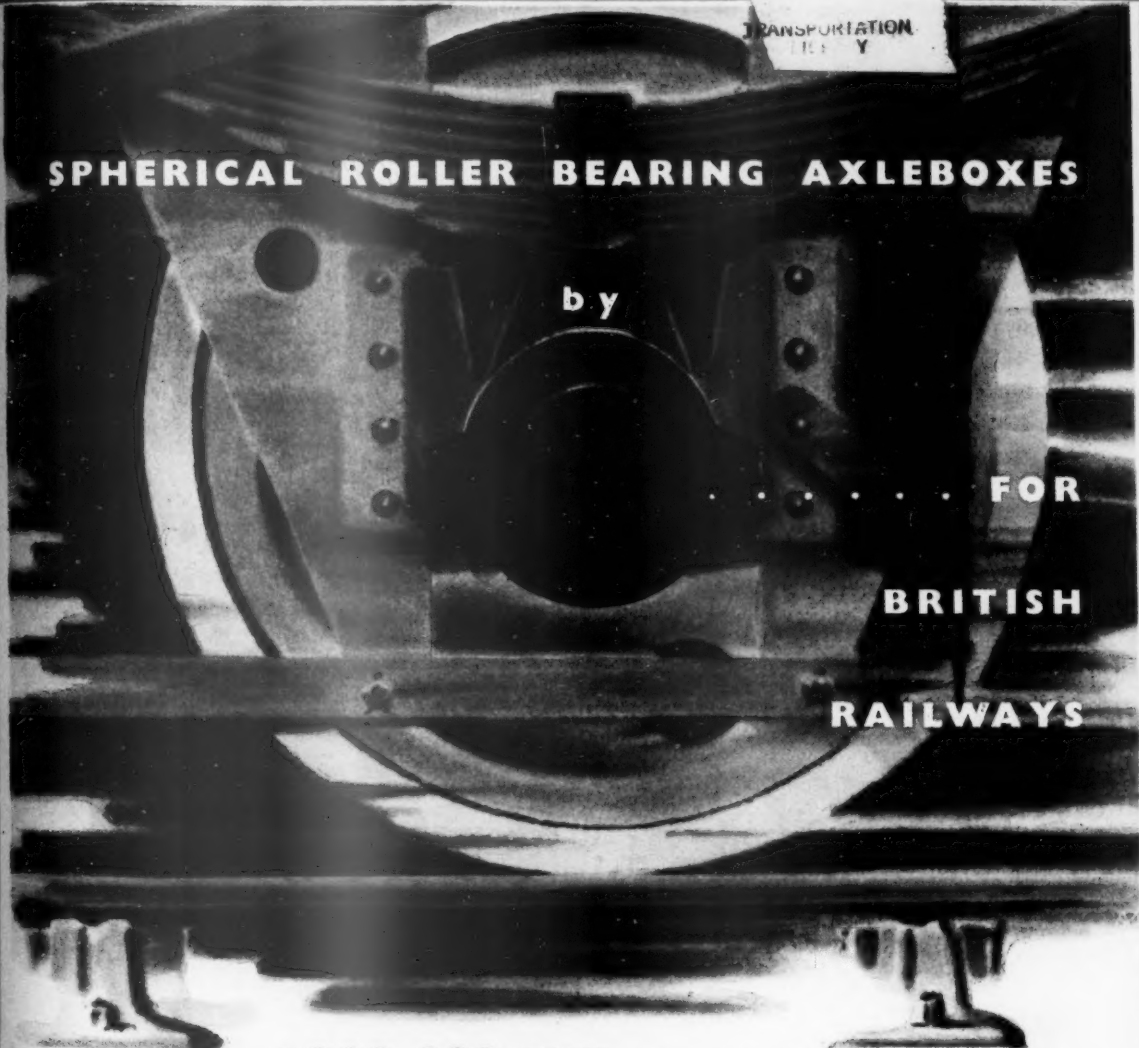
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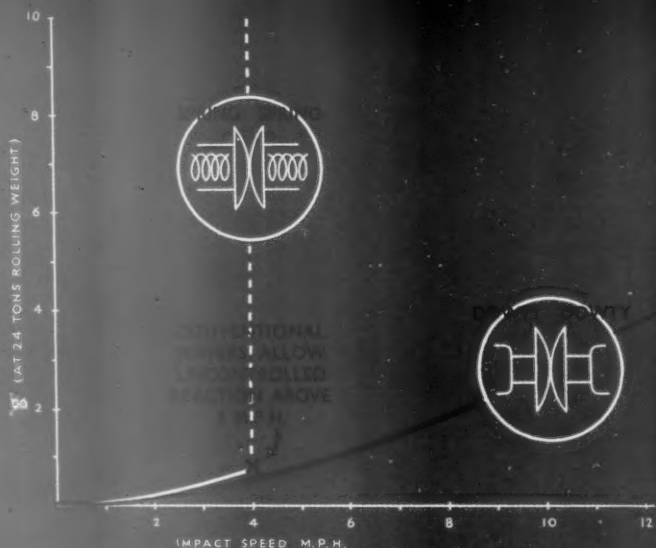
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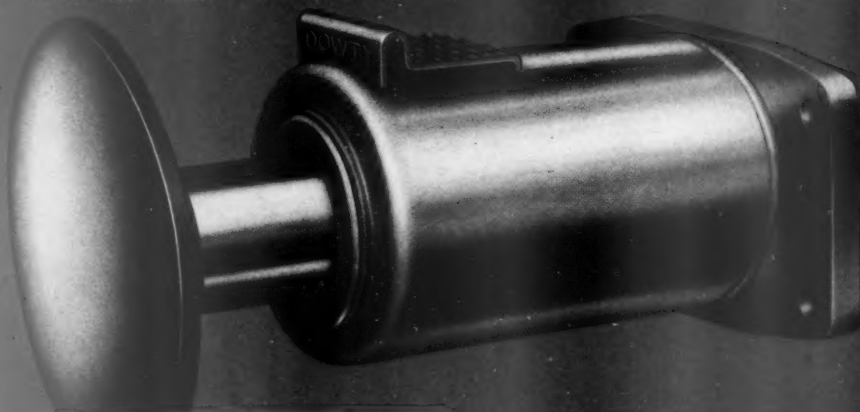
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[No. 11

## CONTENTS

	PAGE
Editorial Notes .. .. .	293
A Challenge to British Railways .. .. .	295
Malayan Railway .. .. .	296
British Transport Commission Traffic Receipts .. .. .	296
Speed Restrictions .. .. .	297
Letters to the Editor .. .. .	298
The Scrap Heap .. .. .	299
Overseas Railway Affairs .. .. .	300
Two-Tier Motorcar Transporter .. .. .	302
Effects of Mining on British Railways .. .. .	303
Electric Traction Section .. .. .	305
Personal .. .. .	313
New Equipment and Processes .. .. .	316
News Articles .. .. .	317
Contracts and Tenders .. .. .	321
Notes and News .. .. .	322

### Too Many Committees

PROMPT and vigorous action is required at all levels of British Railways management to ensure, amongst other things, speeding movement of traffic; and prompt and clear decisions are needed to cut through procedural knots and end uncertainty. Action and decisions spring from men rather than from deliberative bodies; and because meetings tend to postpone decisions, they often waste the time of their members. Tardiness in action and decision noticeable on the railways today are largely attributable to a plethora of meetings. Before nationalisation the number of committees was proportionately smaller than it is now. A good many committees of delegates from all the railways were created by the need for concerted action. Even so, many who attended them complained of a waste of time. Apart from these and from the meetings of the company boards and committees of the directors, action and decision were the responsibility of the general manager and appropriate officers at each level. There were committees for guidance and fact-finding. In general, and certainly in the golden age before the war of 1914-18, the system was largely one of a highly efficient and enlightened autocracy. Nor were strong personalities lacking who were prepared to shoulder responsibility. The complex structure of the nationalised railway undertaking, especially at its general

headquarter level, seems to proliferate deliberative gatherings. The same tendency is apparent also in the Regions. Time is spent in conference which should be spent on management. The holding of conferences is characteristic of the age, but that is no reason why it should persist on British Railways. When the Chief Regional Officers were re-designated Chief Regional Managers, and, later, General Managers of their Regions, there were signs of a return to wholesome autocracy; and indeed some General Managers have taken the opportunity fully to exercise the responsibilities vested in them. The appointment of Area Boards has not made the position of General Managers any easier as regards taking decisions. One of the objects of the new traffic organisations in the Regions is to place the responsibility on one officer, at the appropriate level, to provide efficient transport and to sell it. Whether the newly-appointed traffic managers have been able yet to manage, is doubtful. Our impression is that committees persist in large numbers in the sphere of traffic management as in other activities. Determination may be necessary at central headquarter level of policy affecting British Railways as a whole; but there already exists at 222, Marylebone Road, a host of officers and others appointed to advise on all-line policy. With fewer meetings there, the Regions might follow suit, and all officers be freer to carry out their proper duties.

### The Late Colonel Rudgard

YET another familiar figure has gone from the transport scene, and one whose passing will be mourned by many. Lt.-Colonel Harold Rudgard, whose death is recorded in this week's Personal Section, was the epitome of the "good companion." Approachable, enthusiastic, and high-spirited, he combined a real talent for friendship with sound practical railway experience gained during 50 years of service. That knowledge, and his abilities to organise and lead, combined to make him one of the foremost authorities of his day on motive power. On retirement in 1950 from his last full-time appointment as Chief Officer (Motive Power) to the Railway Executive, Colonel Rudgard did not sever his connection with transport. He became Chairman of the Festiniog Railway Society Limited, and plunged into the activities of that organisation with all his customary energy and enthusiasm. His death, shortly before the re-opening of a further stretch of the railway, comes as a heavy blow to that system, and his cheerful and lovable personality will be particularly missed on that occasion.

### Institution of Locomotive Engineers Luncheon

MEMBERS of the Institution of Locomotive Engineers and their friends at the annual luncheon of the Institution last week heard a memorable speech by the principal guest, Mr. Harold Watkinson, Minister of Transport & Civil Aviation; this is the subject of an editorial article on page 295. The President, Mr. E. S. Cox, rightly emphasised the value of the Institution to the railway engineering industry, not least because of the high quality of the papers presented. A particularly pleasing and deservedly popular feature of the proceedings was the presentation by Mr. Cox to Mr. J. F. B. Vidal, last year's President, of the Bronze Medal of the Institution for outstanding services on its behalf. No President has worked harder than Mr. Vidal, who combines great efficiency, industry, and exceptional mechanical engineering knowledge and experience with courtesy and consideration for all with whom he deals. These qualities have been of great value to the Institution, which has now given a token of its gratitude.

### Electrification Progress in Japan

THE year 1956-57 was notable on the Japanese National Railways both for completion of main-line electrification at 1,500 V. d.c. between Tokyo and Osaka, by conversion of the Maibara-Osaka section of 68½ miles, and by the first stages of an industrial-frequency electrification

programme with the wide objectives outlined in our issue of November 23, 1956. These developments are recorded in the booklet, "A Year Book of J.N.R. Information," reviewed on another page, with many other facts illustrative of the progress of railway electrification in Japan. Most of the figures quoted in tabular form are as at the end of 1956 and give a 20-year comparison. In that time, for example, electrified mileage increased from 380 to 1,260 route-miles, and the number of electric locomotives from 169 to 583. In the same period the number of motor coaches and trailers has gone up from 1,553 to 3,256. The stock of steam tank locomotives has decreased from 1,035 to 730, although tender engines now stand at 4,054 against 3,018. The proportion of electric to steam locomotives of both types, however, has risen from 4 per cent to over 12 per cent. The potentialities of a.c. rectifier locomotive practice for a 3-ft. 6-in. gauge system with much light rail are well exemplified by comparing the 1,500 kW. continuous rating of the 62-ton "ED 70" Bo-Bo class, with the 1,900 kW. for one hour of the d.c. "EF 58" class, with the 2-C+C-2 wheel arrangement and a weight of 115 tons.

### Overseas Railway Traffic

**E**AST African Railways & Harbours approximate railway revenue for the month of January was £1,751,000, compared with £1,525,000 in January, 1957, an increase of £226,000. There were substantial increases in receipts from most services. Traffic up-country from Mombasa Island at 128,400 tons was the highest tonnage ever recorded for this section of the line, and 4,800 tons more than during January, 1957. Operating revenues of the Canadian National Railways for January, 1958, amounted to \$54,341,000. Expenses, taxes, and rents totalled \$60,078,000, resulting in a net operating income deficiency for the month of \$5,737,000. In January, 1957, operating revenues were \$65,655,000; expenses, taxes, and rents were \$64,677,000 and net operating income was \$978,000. Canadian Pacific Railway revenues for January were \$36,115,350 (against \$25,682,267 for January, 1957) and railway expenses \$35,536,994 (\$29,066,026), so that net earnings were \$578,356 (\$3,383,759 deficit). Railway operating revenues of the International Railways of Central America for January amounted to \$1,404,265, a decrease of \$206,139 compared with January, 1957. Net income for the month was \$58,220 (\$177,245). The Midland Railway of Western Australia estimated road and railway receipts for December, 1957, were £A64,970 (against £A57,774 for December, 1956).

### Historic French Line Electrified

**A**LTHOUGH only 36½ miles long, the recent S.N.C.F. 1,500-V. d.c. electrification from Lyons to St. Etienne covers the route of the first railway in France to use steam locomotives. It is also the first part of the electrification programme for areas south of Lyons to be completed; this south-westerly link with the coal mining and other industries on the Loire is complementary to the main Lyons-Avignon-Nîmes conversion scheme. When the inaugural electric train ran to St. Etienne on January 16 last, Monsieur Charles Boyaux, General Manager of the French National Railways, laid a wreath on the memorial at St. Etienne to Marc Séguin, who, with his brothers, promoted and built the original line. Séguin left his mark on locomotive history by the patent he lodged in 1828 for a boiler with tubes to increase the heating surface; our contemporary, *La Vie du Rail*, recalls a visit by Séguin to the Stockton & Darlington Railway in 1827, which confirmed his enthusiasm for the future of the steam locomotive. A century-and-a-quarter later, French achievements in electric traction have been a similar stimulus to development in electrification in this country. The Lyons-St. Etienne conversion has been accompanied by the signalling improvements recorded in our February 21 issue and by simplification of the junctions at Givors. Only 3½ miles of high-tension line had to be erected to link the three new sub-stations with the Electricité de France grid.

### Motive Power Developments in France

**T**HE extensive electrification now making good progress, and more particularly the rapid conversion at 25 kV., 50 cycles, are the most remarkable development on the French National Railways. Particular interest attaches, therefore, to the outline of French electrification progress given in London last week by Monsieur Pierre Weil, Chief Public Relations & Press Officer of the S.N.C.F.; he was reading a paper on developments and prospects of the French railways to a joint meeting of the Institute of Transport and the British Section of the Société des Ingénieurs Civils de France. Perhaps the most striking, because least familiar in Britain, of the facts related by him is the speed at which electrification is taking place. Completion dates for various sections were given on page 291 of last week's issue. Diesel traction also is progressing. Monsieur Weil referred briefly, for instance, to the almost complete turnover to diesel traction, by locomotives and railcars, of lines of the Western Region south of the Loire. "Vistadome" 825-h.p. railcars are to operate this summer along the Riviera and across the Massif Central.

### S.N.C.F. Rolling Stock

**M**ANY other technical developments on the S.N.C.F. are mentioned in a comprehensive paper; most of these have been dealt with in this journal from time to time. In the design of passenger stock, the French National Railways lead the way on the Continent. The "Mistral," for instance, between Paris and Nice, is the only air-conditioned train in normal service in Europe. An indication of the faith of the management in the future of passenger traffic is the decision greatly to increase the amount of sleeping accommodation in long-distance trains. As to freight vehicles, the management has taken extensive steps on the one hand to pursue standardisation and on the other to develop wagons for special traffic; the latter include those with sliding roofs described in last week's issue, double-deck motorcar wagons, and wagons for transport of powders. Operational research is conducted on a large scale by a special group.

### Cross-Country Diesels in the Western Region

**I**NTRODUCTION of Swindon-built three-car diesel multiple-unit sets in the Western Region has made possible diesel operation of some cross-country services between Cardiff and Bristol and Birmingham and certain other South Wales towns; these were previously steam worked. The sets have also replaced four trains between Cardiff and Birmingham, two each way, formerly operated by inter-city diesel trains turned out by Swindon in 1956. The new "cross-country" sets resemble them in some respects. Their formation is one second class and one composite motor coach at each end with vestibule connection with a second class trailer in the centre; this vehicle includes a small buffet, a welcome feature on many of the runs made by these trains. Power is derived from four "A"-type 150-h.p. engines supplied, as is the control and transmission equipment, by British United Traction Limited. The "cross-country" sets will provide passenger facilities normally associated with the inter-city trains, with more economic operation where the traffic is not large enough to justify the larger formations.

### Gauge Conversion in Victoria

**C**ONSIDERATION of the difficulties that might be encountered in operating existing services has led to a change in plans for the standard-gauge line between Melbourne and Sydney. A separate standard-gauge line is now to be built by the Victorian Railways between Mangalore and Broadmeadows instead of converting one of the two broad-gauge (5-ft. 3-in.) lines. A new standard-gauge line will be built from Mangalore to Wodonga, alongside the present single broad-gauge line, to link up at Albury with the New South Wales Railways standard-gauge line to Sydney. A section of the existing line

between Tallarook and Seymour will be converted to obviate the building of another bridge over the Goulburn River. Between Broadmeadows and Melbourne there is no room for a third track along the direct line to Spencer Street through Essendon, so the new line will swing in a wide arc via Albion, Sunshine, and Footscray, partly over converted goods lines. All existing bridges, except those over the Goulburn River and its overflows, will have to be widened. The longest on the line are the Broken River Bridge at Benalla, 800 ft., and the Ovens River Bridge at Wangaratta, 700 ft. Aerial and field surveys for the line are nearing completion and tenders are expected to be issued in the near future.

### Design of Railway Buildings

THE work of the Nuffield Trust Division of Architectural Studies has shown that detailed investigations into the functional requirements of buildings can lead to substantial improvements and economies in design. Advantage has been taken of these findings by the Eastern Region of British Railways in a study of the design of power signalboxes. The data so far obtained have been issued as an interim report already in use in the architect's office of the Eastern Region. The purpose of investigations of this kind is to enable the architect's office to design buildings which are more efficient in operation, more economical in design, and possibly more satisfactory aesthetically, than those produced in the past. Although the assistance of the Nuffield Trust has not been sought by the London Midland Region, a study of functional requirements has played a large part in the design by that Region of new buildings for newly electrified lines. Outstanding features are good appearance, permanence, and easy maintenance. The buildings are of standardised components of steel, aluminium, wood, plastic, and special compositions, produced in factories and assembled on site. Erection has already begun at stations near Manchester on the Manchester-Crewe line now in course of conversion.

### Challenge to the Railways

SELDOM can a more timely, informative and challenging speech on the major problem facing the railways have been made by a member of any Government than that delivered last Friday by Mr. Harold Watkinson, Minister of Transport & Civil Aviation. He was addressing the Institution of Locomotive Engineers at its annual luncheon. Although he spoke little of locomotive engineering, his remarks on what had been achieved and what is to be achieved in future by diesel and electric motive power in enabling British Railways to provide better services showed recognition of what locomotive engineers have accomplished, but indicate that more is required. With this appreciation of what has been done, he gave an analysis of the present serious financial situation and an intimation that, unless the nationalised railways could achieve better financial results, the Minister might find it hard to justify to the Government further advances of funds for modernisation. He expressed a belief that the railways eventually would win through to prosperity. The value of his speech is enhanced by its moderation; his views were stated without exaggeration or heat, but his sober appraisal of what was unsatisfactory was not the less disturbing and challenging.

Two years ago, when he first addressed the Institution soon after his appointment as Minister, Mr. Watkinson spoke of the British Railways modernisation plan, which had then been in operation for just over a year. Looking at the plan today, he found that passenger traffic matters promised reasonably well. Electrification was progressing satisfactorily; it was even ahead of schedule in the London Midland Region. The many diesel railcar and multiple-unit train services introduced in the past three years had certainly created traffic and showed that the public was receptive to good service, though, as he remarked, it could not be claimed that net receipts had increased in proportion to the traffic. Indeed, British Railways passenger

receipts in recent months had been disappointing. That was not to say that the extensive amelioration of services in progress would not result in much increased revenue. The agreement between the British Transport Commission and the railway trades union on the manning of diesel and electric locomotives, railcars, and multiple-unit trains, discussed in detail in our January 3 issue, was rightly praised. It was, as he pointed out, a sign that the unions could be persuaded to agree to "new and almost revolutionary practices." Like most agreements of this kind, it was bound to be a compromise, and one which presented great difficulties to the union leaders. It showed also that a good many footplate staff appreciated the ultimate benefits which they would derive from the widespread substitution of diesel and electric motive power for steam.

By far the most important part of the Minister's speech, and one that deserves the most careful attention of all ranks of railway personnel, dealt with the freight traffic situation. This is disquieting, more particularly as to the decline in merchandise and livestock traffics. Whatever the reason, this, as Mr. Watkinson states, demands vigorous action both to improve railway freight services and to sell them, perhaps to many potential railway users who do not realise that the services, despite many defects, and notably losses of and delays to small consignments, are as good as they are. That is not to say that they could not be very much better. They will have to be, if that marginal traffic is to be won, or won back, which will make so much difference to British Railways finances. Mr. Watkinson's remark must be borne in mind, that only a radical improvement in financial results can justify investment of further sums in modernising plant and equipment.

Much is being done to accelerate freight traffic by means of improved motive power, fitting of continuous brakes, elimination of marshalling, and other measures. They will go far to improve purely rail transits, and siding traffic is more than half British Railways freight. Even in such traffic the human element can do much to eliminate delays by ensuring punctuality of freight trains. How many of the staff concerned are seized of the vital necessity of ensuring quick transits?

More difficult is the problem of door-to-door transport provided by the railways. Mr. Watkinson emphasised the desirability of palletisation and use of containers and other devices for minimising transshipment and sorting. As to "piggy-back" transport of loaded lorries on flat wagons, and the two-tier transport of motorcars, he admitted the difficulties caused by the restricted British loading gauge, but suggested that the use of these "roll-on/roll-off" methods should be examined carefully. Officers of British Railways have been studying new methods and devices in the U.S.A. and elsewhere. It would be reassuring to hear that the central management of British Railways has been, and is, giving serious consideration to their adoption. The situation is too serious to allow any possible means of improvement to be left unexplored. The necessity for prompt action to improve railway services cannot be over-emphasised, for the future of the railways will be decided in the next few years. It may well be that time will enable the problems of improving their services to be solved; but time is short. Meanwhile, the Minister suggested that "the national gift for inspired inspiration" should be used. In our view the time is overdue for a complete rethinking of the traffic problem and for a much more ruthless direction of the effort to attract cargoes. Until every department and all grades of railwaymen are seized of the fundamental need to attract and carry freight traffic speedily, efficiently, and economically, the future of British Railways must be dim. It should be realised that "restrictive practices" are not confined to the conciliation grades, but wherever they occur they should be dealt with immediately.

The Minister mentioned the Merchandise Charges Scheme which facilitates quotation on more equal terms with other transport. This scheme was intended to afford flexibility, which should have resulted in speedier quotation of attractive rates. If that has been the case, the results in traffic are disappointing. Mr. Watkinson referred also to the new traffic organisations in, at present, four of

the six Regions; they are claimed to resemble one another in co-ordinating more closely than hitherto, commercial, operating, and motive power activities. He mentioned the benefits of these changes as being realised in the future. Some of the traffic organisations have been in force for several months, and tangible results are not apparent. In any case, the co-ordination of activities stated to result from reorganisation often existed before, where the departmental officers concerned exercised goodwill and common sense, and the general management gave firm guidance.

Finally, the intention of the Government as to "C"-licence transport was stated by the Minister. The amount of such transport is not to be restricted, because that might raise the cost of industrial production. The onus is thrust fairly on the railways so to improve their services as to ensure that these will attract a large share of the traffic at present being moved by "C"-licence vehicles. Transport managers of firms, he suggested, may sometimes jump to conclusions instead of making certain that the public haulier, by road or rail, cannot give the required service economically. Otherwise, he challenged the railways to provide freight services so that the traffics best suited to them can be moved more cheaply and efficiently, on a competitive basis.

### Malayan Railway

THE Chairman & General Manager of the Malayan Railway, Mr. C. G. Harrison, has sent us a copy of his report upon the working of the metre-gauge Malayan Railway during 1956. The report, which is remarkably well produced, opens with a colour-plate reproduction of a relief map of the country served by the system and an introduction, mainly geographical.

During 1956 there was again a record total revenue from rail, port, ferry and other services of \$76,644,424 (\$66,792,94), 15 per cent higher than the 1955 figure shown in brackets. Expenditure amounted to \$71,176,969 or \$74,915,346 including interest, loan redemption, new and improved capital works and other charges. Taking into consideration appropriations for Communist terrorist damage, fire insurance and betterment and development reserves, together totalling \$1,729,078, the aggregate offset against revenue earned was \$76,644,424. The increase in revenue was due mainly to higher rates and fares and a larger volume of rail and port goods traffic. Expenditure on recurrent services, excluding renewals, was higher by some \$8,500,000 due to enhanced wages (in some cases 30 per cent), shorter hours of duty and rising costs of fuel oil, stores and materials. Contributions to renewals was higher by about \$1,700,000.

The following are some of the principal results:—

	1955	1956
<b>Railway—</b>		
Passenger train-miles (revenue earning) ..	1,858,493	2,078,861
Goods train-miles (revenue earning) ..	2,412,834	2,620,651
Passenger journeys .. .. .	7,686,839	7,508,753
Goods tonnage .. .. .	2,237,479	2,457,431
	\$	\$
Passenger revenue .. .. .	16,685,356	19,622,032
Goods revenue .. .. .	31,347,627	36,368,647
Total revenue .. .. .	52,958,961	61,877,267
Working expenses .. .. .	42,504,274	49,488,235
<b>Collection &amp; Delivery Services—</b>		
Revenue .. .. .	640,846	741,651
Working expenses .. .. .	659,347	789,282
<b>Ports—</b>		
Revenue .. .. .	9,915,671	10,014,437
Working expenses (recurrent) .. .. .	7,745,425	8,653,223
<b>Ferries—</b>		
Revenue .. .. .	548,137	701,405
Working expenses .. .. .	626,890	734,397

Considering the large increase in unavoidable operating expenses and the continuance of the "emergency," as acts of terrorism are called, which restricted night running to the very few trains protected by armoured railcars on patrol or acting as pilots, the financial results for the year were satisfactory. They were secured by improved services, modernised equipment and more economical methods of operation in addition to enhanced rates and fares, which were, however, considered to be nearing the commercial

limit beyond which proportionate increase in revenue could not be expected.

Though sabotage on tracks and communications was relatively slight, there were 17 attempts to damage the track, and signals and telecommunications were cut on nine occasions, and a goods train was seriously damaged by deliberate derailment on the main line in Perak. Modernisation, begun in 1954, made good progress during the year under review, especially in respect of main line track, signalling, interlocking and token exchange, in anticipation of the delivery of the diesel locomotives on order and expected to begin in May, 1957. Orders were also placed in Australia for the first lot of diesel railcars, delivery of these is expected shortly, as stated in our January 3 issue. The Legislative Council approved in July, 1956, the decision to construct the first three deep-water berths in the North Klang Straits at Port Swettenham with access to them by a new combined rail and road bridge over the Klang River.

The management was faced with the serious shortage in trained and experienced engineers and there was therefore need to re-deploy the professional expatriate officers remaining and the few trained and experienced local officers available in such a way as to maintain essential business; departmental reorganisation was being planned accordingly. Malayan officers were not capable of filling adequately every post in the service, and the problem was to tide over the period until they should be able to do so.

### British Transport Commission Traffic Receipts

BRITISH Railways freight and passenger receipts for Period 2, the four weeks to February 23, are melancholy reading. Merchandise and livestock receipts at £7,876,000 are £1,604,000 below the corresponding figure for last year; even if it is accepted that the restrictions on fuel oil occasioned by the closure of the Suez Canal resulted in a temporary railway freight traffic boom, comparison with merchandise receipts for Period 2 of 1956 (£8,056,000) is not encouraging in the light of rate increases during the past two years, of the necessity for the railways to increase their receipts so as to meet their obligations, or of the freedom given them under the Freight Charges Scheme to achieve this object.

	Four weeks to February 23		Incr. or decr.	Aggregate for eight weeks		Incr. or decr.
	1958	1957		1958	1957	
	£000	£000	£000	£000	£000	£000
<b>Passengers—</b>						
British Railways ..	8,245	8,996	— 751	16,444	17,952	— 1,508
London Transport: ..						
Railways ..	1,783	1,858	— 75	3,589	3,779	— 190
Road services ..	4,405	4,589	— 184	8,731	9,221	— 490
Provincial & Scottish buses ..	4,008	4,242	— 234	8,020	8,545	— 525
Ships .. .. .	195	169	+ 26	447	396	+ 51
Total passengers ..	18,636	19,854	— 1,218	37,231	39,893	— 2,662
<b>Freight, Parcels &amp; Mails—</b>						
British Railways: ..						
Merchandise & livestock ..	7,876	9,480	— 1,604	15,208	18,919	— 3,711
Minerals .. .. .	4,009	4,279	— 270	7,929	8,697	— 768
Coal & coke .. .. .	11,216	11,247	— 31	21,822	22,008	— 186
Parcels, etc., by passenger train ..	3,927	3,836	+ 91	7,644	7,484	+ 560
Collection & delivery, etc., ..	949	1,093	— 144	1,883	2,143	— 260
Total freight British Railways ..	27,977	29,935	— 42	54,486	59,251	— 4,765
Others* .. .. .	4,179	4,233	— 54	8,125	8,177	— 52
Total Freight, Parcels, and Mails ..	32,156	34,168	— 2,012	62,611	67,428	— 4,817
Total .. .. .	50,792	54,022	— 3,230	99,842	107,321	— 7,479

\* Inland waterways, freight, road haulage, and ships

Mineral and coal class receipts are also below the totals for the corresponding four weeks of 1957; coal and coke at £11,216,000 compares reasonably well, in the circum-

stances, with £9,942,000 for Period 2 of 1956. Parcels receipts at £3,927,000 are up on last year and the year before.

Passenger receipts of British Railways at £8,245,000 are not only £751,000 below the 1957 total for the same four-week period, but are disappointing compared with 1956 (£7,242,000): here again account must be taken of last year's petrol shortage and of fare increases. London Transport railway receipts for Period 2 of 1958 are £75,000 below last year's figure, and the road services £184,000 below it; comparison with 1957 is complicated not only by the fuel oil restriction, but also by the effects of adjustments of bus services, which also invalidate comparison with 1956. Ships' passenger receipts at £195,000 show an increase of £26,000 compared with last year, occasioned to a great extent, at this season, presumably, by winter sports traffic to the Continent. Against these apparently satisfactory rises in ships' passenger traffic must be set increased costs; and it would be interesting to see the corresponding figures for mails and cargo.

The first eight weeks of the current year have resulted in aggregate traffic receipts for the British Transport Commission of £99,882,000, or £7,479,000 less than last year, and exceeding the corresponding aggregate for 1956 (£95,468,000) by a disappointingly small margin.

#### PERCENTAGE VARIATION 1958 COMPARED WITH 1957

	Four weeks to February 23	8 weeks to February 23
<i>British Railways—</i>		
Passengers .. .. .	- 8.3	- 8.3
Parcels .. .. .	+ 2.4	+ 2.1
Merchandise & livestock .. .. .	-16.9	-19.6
Minerals .. .. .	- 6.3	- 8.8
Coal & coke .. .. .	- 0.2	- 0.8
C. & D. services .. .. .	-13.1	-12.1
Total .. .. .	- 6.9	- 8.0
<i>Ships (passengers) .. .. .</i>	+15.3	+12.8
<i>British Road Services, Inland Waterways and Ships (cargo) .. .. .</i>	- 1.2	- 0.6
<i>Road Passenger Transport, Provincial &amp; Scottish ..</i>	- 5.5	- 6.1
<i>London Transport—</i>		
Railways .. .. .	- 4.0	- 5.0
Road services .. .. .	- 4.0	- 5.3
Total .. .. .	- 4.0	- 5.2
<i>Aggregate .. .. .</i>	- 5.9	- 6.9

### Speed Restrictions

IT will always be necessary for railway civil engineers to impose restrictions on train speeds. In an article in the April, 1957, issue of *British Transport Review* by Mr. G. F. Fiennes, Traffic Manager (Great Northern), Eastern Region, British Railways, the impression may have been given to some readers that the Engineering Department is responsible for some 30 per cent of passenger train delays and has no particular interest in the running of trains to time. It was also suggested that the planning of engineering works which affect the running of trains is not sufficiently accurate and does not look far enough ahead. In the December, 1957, issue of the *Review*, Mr. J. A. Mayled, Assistant (Permanent Way) to the Chief Civil Engineer, London Midland Region, deals with speed restrictions from the engineer's point of view, and shows the care with which permanent way work on British Railways is programmed for as much as 2½ years ahead.

Permanent speed restrictions, he points out, are necessary in the majority of cases because of some physical characteristics of the line, such as curves or the incidence of points and crossings. Most of these restrictions could be removed—at a cost—but some of them would entail re-siting the railway. Nevertheless, whenever work such as track renewal presents an opportunity, and the removal or easing of a permanent restriction is a practicable proposition, the matter is discussed between the Operating and Engineering Departments. Temporary restrictions are imposed primarily because of interference with the support of the permanent way during relaying, reballasting, formation renewal, drainage, bridge reconstruction, and so

on. The engineers have the duration of each restriction under constant review.

In the planning procedure agreed between the Operating and Engineering Departments for the programme of works involving speed restrictions and line occupations, the arrangements naturally vary from Region to Region. The object in every case is to arrange work so as to interfere as little as possible with traffic operation. One aspect is the pattern of restrictions and occupations into which the engineers must fit their work. In one Region restrictions must not be imposed within a specified distance of one another on one line. In another the main lines are divided into sections and a predetermined number of restrictions is permitted within each section. Because of the dense holiday traffic, confined to the relatively few weeks of the summer in this country, fewer restrictions are allowed during the currency of the summer timetable than in winter. The planning procedure enables the engineers to build up a programme of work which conforms with operating requirements and allows the Operating Department to incorporate reasonable recovery margins in the working timetables. The programme of engineering work is discussed at regular meetings between representatives of the departments concerned.

There is no doubt, Mr. Mayled considers, that the execution of works in connection with the modernisation plan for British Railways will demand a substantial increase in the number of temporary speed restrictions and line occupations. The best course, he believes, will be to spread these over as long a period as is possible. As to renewals, long experience has shown the average life to be expected from track of various types in given situations, and it is possible to make a reasonably sound estimate of the amount of renewals which should be needed in each year. The estimate is modified in accordance with the results of track inspections.

The build-up of the annual programme starts with the length ganger, who keeps his permanent-way inspector informed as to the condition of the track. The inspector, after discussion with the gangers, decides on the lengths of track he will recommend for renewal. These recommendations are submitted to the District Engineer, who makes his own inspection and then presents his renewals programme to the Chief Civil Engineer. In the interests of uniformity, a headquarters inspection follows and an approved programme is drawn up. This whole process takes some 18 months, and is completed by August for work starting in the following January. The permanent-way work is collated with programmes for earthworks, drains, reballasting, and bridges, and the execution is then planned in accordance with the availability of staff and materials—and also with the procedure agreed with the Operating Department.

The work to be carried out at the end of any given year has, in effect, been planned 2½ years ahead. It sometimes happens that rapid deterioration in a particular length makes it necessary to renew it before its programmed time. The usual course is to carry out this work and to cut out an equivalent but less urgent length from the programme. To make long-range forecasts of renewals might require the District Engineers to make their inspections some 3½ years ahead of relaying, and it is apparent that many revisions would be required, with a spate of supplementary proposals and substitutions, so that the programme would be changed beyond recognition.

The work is planned so that the restriction imposed for one task is removed before that for another comes into force. From the engineering point of view, a substantial reduction in the duration of speed restrictions could be achieved if absolute occupation of the track could always be long enough to pack the track properly before trains pass over it. Similarly, the introduction of long welded lengths of track has called for more track occupations, and if these are to be kept to a minimum the Engineer will need to have a much longer absolute occupation than is usual at present. Mr. Mayled concludes by asking what more the Engineer can do to avoid train delays. Possibly, he suggests, attention should be focused on the realistic planning of timetables.

## LETTERS TO THE EDITOR

(The Editor is not responsible for opinions of correspondents)

### Delivery of British Railways Diesels

February 23

SIR,—The second month of 1958 is almost at a close and some 27 months have elapsed since the British Transport Commission placed the first orders for the main-line diesel locomotives required under the modernisation plan. A fuss is made whenever a new main-line diesel locomotive appears; yet little publicity is given to the fact that the delivery of these machines is behind schedule.

It is true that the handing over of the "D8000" class by the English Electric Co. Ltd. and of the "D5500" class by Brush Traction Limited is slightly ahead of schedule; but on the debit side the picture is disappointing. According to the 1957 building programme of British Railways, which admittedly can only be a rough guide, the following diesel locos should have entered service in 1957: D200-209, D600-604, D800-802, D6300-6305, D8200-8206, D8400. Of these, only D600 and D8200-1 were completed, and less than one-half of the estimated number entered service in 1957. The Eastern Region had hoped to commence an accelerated service on their Great Eastern main line with the 2,000-h.p. "D200" class this month.

Yours faithfully,

H. PLANG

28, Kents Lane, Copenhall, Crewe

### Design Appearance in Railway Equipment

March 12.

SIR,—In your issue of February 28 you printed a letter from Mr. W. Sydney of Hastings in which I was pleased to find that gentleman writing in support of some views expressed by me in a recent talk to the Design & Industries Association. Unfortunately, he goes on to make some statements about the British Transport Commission Design Panel which are at variance with the facts. I should be grateful if you would allow me space to correct some of these statements.

On many occasions in the last few years the Commission has been urged to pay more attention to the aesthetic aspect of equipment design and to secure the benefit of the best expert advice in this field. In response to this pressure it has appointed a small Panel, largely internal, with a staff of two, which meets five or six times a year. It has told its various managements that the Panel is available to assist them if they so wish, and that it hopes the managements will make use of it. This is what Mr. Sydney calls the "sledgehammer method." It is hardly a word that it would occur to many of your readers to use in describing such an arrangement. He then goes on to say that the Panel has set up independent teams that "sit with, and frequently on" the designers of equipment, and "graft appearance" on the work of those designers. It has done nothing of the kind. Wherever design consultants have been introduced by the Panel, they have worked from the earliest stages as integral members of the design team responsible for the complete job. Indeed, the Commission has clearly told the Panel that aesthetic and technical design must go hand in hand and must be treated as parts of a single process.

Incidentally, Mr. Sydney is incorrect in describing the new diesel locomotives that have recently been delivered as examples of the Panel's influence. The design teams of these locomotives, like those for the carriages shown at Battersea Wharf last year, were formed 12 months or more before the Design Panel was set up.

I cannot answer Mr. Sydney when he says that the Commission is "obsessed," that is to say haunted or harassed, with appearance, because I cannot imagine what he means. The Commission is trying to continue and consolidate the good work started before the war by people like Sir Harold Hartley, Sir Nigel Gresley, and Lord Ashfield,

none of whom appear to have struck people as haunted or harassed men. But I can tell him what those at close grips with the daily problems of British Railways think and feel about the Design Panel. A large majority of them are worried about the appearance of the buildings and equipment of our railways for which they know the railways themselves are not to blame. They see the formation of the Panel as one of a number of steps that are being taken to restore the railways to something like the smartness that distinguished them in the past. It has been a stimulating experience for me to find how warmly the Panel has been welcomed among Regional managements; but I do not think anything has impressed me so much as the interest and pleasure shown among the rank and file, from drawing office staffs to the men in uniform and those on the workshop floor. There is no defeatism among these men. They are convinced that the future of the railways is full of promise, but they also know that a first-class turnout is one of the things needed to secure it.

Yours faithfully,

GEORGE WILLIAMS,  
Design Officer

British Transport Commission,  
222, Marylebone Road, N.W.1.

### Passenger Coach Design

February 20

SIR,—The tendency recently seems to have been to build a smaller proportion of compartment-type coaches. Observation of long-distance trains at a terminus seems to show that most passengers only enter saloon coaches after the modern compartment-type vehicles are well filled.

Silent running would greatly reduce fatigue and would be an important asset in favour of rail travel, even though the average second class passenger at present accepts as normal the rather noisy riding of modern coaches. The improved silence and comfort brought about by long lengths of welded rail, as in France, has to be experienced to be appreciated; but sound insulation plays its part.

Another point which needs stressing is cleanliness. It would be desirable to spend more money on keeping upholstery clean, even although the amount of new construction were to be reduced in consequence.

Yours faithfully,

E. A. K. JARVIS

16, Pemberton Drive, Bradford, 7

February 21

SIR,—In reply to the letters from Messrs. L. A. Mack and J. E. Lake published in your February 21 issue, I must make it clear that I do not consider the arrangement which I suggested to be suitable for universal use in all conditions. For the most grossly overcrowded Southern Region routes of up to 15 miles, I propose four sets of double doors a side, with only 40 seats a trailer. This standee arrangement, with seating only for off-peak loads, seems the only economic solution for the Eastern Section of the Southern Region.

Returning to "sameway seats" for more civilised conditions, I can only re-state that they are most popular with passengers in this area, who use both Southern-type electric stock and the bus-style diesel railcars.

Vertical grab rails, from the back of each seat to the roof, as in omnibuses, could be provided; and straps can be provided in standard stock by suspending them from transverse horizontal rails just above door height. As for luggage racks, they could still be across the coach, associated with the grab rails, or, as in Austria, independent of the seating and suspended from the roof. In the Southern open cars, the racks are too narrow, too low, and not divided, so that only passengers on one of the two back-to-back seats can use the rack over it.

Yours faithfully,

JOHN RODGERS

132, Worrin Road, Shenfield, Essex

## THE SCRAP HEAP

### Wagonload of Monkeys

Six monkeys which operate a miniature train at a Tokyo zoo have gone on strike—led by a redhead from Communist China. A stalwart "black-leg" from Nationalist China remains on duty, but he is getting exhausted. The trains are still running—but late.—From the *"Evening News."*

### Tunnel Rats and Cats

Shortly after the opening of the Simplon Tunnel . . . a serious problem arose—how to keep it clean. It was found that railway passengers had a habit of throwing out orange peel and all sorts of rubbish. A Swiss railway official suggested using rats, and three couples were freed in the middle of the tunnel. This worked splendidly, but after a few years they had multiplied so much that the rubbish could not maintain them. They started to spread out of both ends and there were complaints. The Swiss Federal Railways solved the problem by the purchase of 12 cats. Six were stationed at each end of the tunnel. Since then there has been no trouble. The rats keep the tunnel clean, and the cats prevent them emerging successfully. The cats are on the railway payroll, and regularly receive a certain amount of milk from the administration to vary their rat diet.—*"Peterborough"* in *"The Daily Telegraph."*

### Great Northern Display

Past and present on the former Great Northern Railway and its successor of today, the Great Northern Line of the Eastern Region of British Railways, are featured in a display "Transport Through the Ages" in the foyer of Great Northern House, the new headquarters of the Line Traffic Manager, across the road from Kings Cross. The accompanying illustration shows, in the

centre panel, a Stirling single in front of the old station building at Potters Bar; the right-hand panel depicts the new station there, with an electric locomotive in front, a Metrovick Bo-Bo of the type working on the Manchester-Sheffield line, and not intended to represent one of the types which will operate on the East Coast main line. White wire outlines of these subjects are mounted on self-coloured backboards, some of the interstices of the wire are filled in by appropriately coloured wooden blocks.

The map on the right, by Berta Studios, Limited, shows Eastern Region lines in distinctive colours; it is bordered by stylised cut-outs of features of interest on the East Coast main line.

### End of a Steam Turbine Locomotive

The remarkable steam-turbine-electric locomotive experiment initiated in 1954 by the Norfolk & Western Railway, one of the most important carriers of coal in the U.S.A., has ended in failure. This machine, 161 ft. 1½ in. long and weighing 523 tons, was carried on four six-wheel bogies with all axles motor-driven. The turbo-generators were supplied by Westinghouse; a Babcock & Wilcox watertube boiler supplied steam at 600 lb. pressure; Baldwin-Lima-Hamilton built the body and frame and performed erection.

Nicknamed "Jawn Henry" because of its massive proportions, the machine could handle 4,500-ton loads over heavy gradients, and was showing an economy of 30 per cent in coal consumption compared with steam locomotives of conventional design on the same service. The heavy water consumption made it necessary for an additional tender to be attached, and there have been so many breakdowns of the turbine and the electrical gear, and of water-feeding and

control equipment, that eventually No. 2300 had to be confined to helper service up Blue Ridge Mountain so as to keep within easy reach of Roanoke shops.

### Skater Outstrips Train

Mr. Alan Bloom, in "The Skaters of the Fens" (Cambridge: Heffer, 16s.), tells how a skater in the 1870s competed for a wager with a Great Eastern train from Sandhill Bridge, Littleport, to Ely railway bridge (not at all a sprint distance). He won with half a minute in hand.

### Competition Condemned (1858)

From London to Manchester and back for 5s., with an allowed interval of seven days. Such is the invitation advertised by the London and North-Western and Great Northern Railways. The public perhaps will think it a great advantage, but they will pay dearly for it in the end, and meanwhile the warfare out of which the circumstances arise furnishes another evidence of that utter demoralisation of the classes having the control of the financial resources and general enterprises of the nation which has been exemplified during the past few years in every other channel of business. . . . That which in 1828 was the policy of a set of men [in the stage coach business] as ignorant as the animals they drove is in 1858 the highest resort of boards of directors composed of noblemen, Members of Parliament, merchants, and bankers who profess to claim sway as the most exalted representatives of our commercial progress.—From *"The Times"* of March 8, 1858.

### Last of the "Bluebell Line"

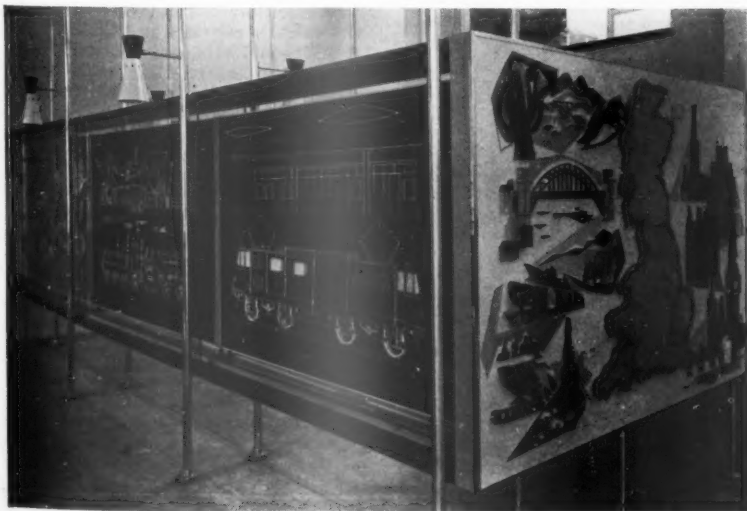
(Passenger services between East Grinstead and Lewes, Southern Region, cease on March 17)

With Parliamentary precision The Minister gave his decision. In terms concise and not too starchy, It said that, round about mid-March, he,

Confronted by financial facts, Would be compelled to wield the axe. Sussex must face up to the blow: The "Bluebell Line" at last must go; For, like so many charming folk, It, too, was beautiful but broke.

Of course, the local population, Expressing righteous indignation and rallying round from near and far (As usual, by motorcar.) Characteristically enthused About the line they seldom used— Enthused, alas, but all in vain; This was the death knell of the train. With no more puff-puffs on the go, Nature resumes the *status quo*.

Ashes to ashes, dust to dust; Naught can escape this mortal "must." Yet here's a thought that's comforting: There will be bluebells there next Spring. A.B.



G.N.R. Stirling single and Bo-Bo electric locomotive working on the Pennine line, in a display at Great Northern House, Kings Cross

# OVERSEAS RAILWAY AFFAIRS

(From our correspondents)

## VICTORIA

### Improvements at Geelong

To facilitate handling of traffic from new wharves at Geelong in addition to port traffic which has to cross the main Melbourne-Geelong line on the level to reach North Geelong yard, a new line is to be built, passing under the main line. In addition, a new connection will give wheat trains a direct run to the terminal wheat elevator at the harbour, without having to enter the yard.

### Diesel Locomotive Mileages

The Co-Co Clyde-General Motors diesel-electric locomotive, *Harold W. Clapp*, which entered service in July, 1952, recently completed 1,000,000 miles; it would have done so some weeks before had it not been withdrawn from service in 1954 for working the Royal specials conveying the Queen and the Duke of Edinburgh. Recently the locomotive has been working the "Overland Limited." It is the first main-line diesel-electric of the Victorian Railways to have completed this mileage, which is stated to have been achieved first by another locomotive not employed on main-line duties.

### Queen Mother's Railway Journey

The only railway journey made by Queen Elizabeth the Queen Mother during her recent tour was on March 2, when she travelled to Ballarat, 73 miles from Melbourne. The Royal train left Melbourne at 2.15, reaching Ballarat at 4 p.m.; it left again for Melbourne at 5.30 p.m., on another 105-min. run.

The locomotives hauling the train were two 1,800-h.p. "S" class diesels, *William Lonsdale* and *John Batman*. A flag-draped plaque bearing the Queen Mother's coat of arms was carried on the front of the leading locomotive. The train consisted of two State coaches, two of the latest saloon coaches, and the restaurant car from the "Spirit of Progress." At the rear end of one State coach was a glass-enclosed observation platform; this vehicle was used previously by Queen Elizabeth when as Duchess of York she visited Australia in 1927; it has since been modernised.

## NEW SOUTH WALES

### Poor Results from Reduced Fares

There has been insufficient traffic to offset fare reductions for shoppers in the Sydney district. The concessions range from a 10d. reduction on a return fare within a 10-mile radius of Sydney to a 3s. 5d. cut on a return fare within 30 miles. It is understood not to be the intention at present to discontinue the concession.

## WESTERN AUSTRALIA

### New Works Authorised

Authority was given recently in a Bill for works in the Perth area. The Bill provides for construction of three lines totalling 15 miles to serve new marshalling yards, and removal of the locomotive depot from East Perth to a new site in the direction of Welshpool. Support for the construction of the

new railway lines to link the proposed new Welshpool marshalling yards, the Midland Junction workshops and the South-West line at Cannington, was given in a report by the Western Australian Transport Board.

It is claimed that the new lines would divert a considerable volume of traffic from the city of Perth, and that they would expedite traffic to and from the metropolitan area and the transfer of traffic between the South-West line and other parts of the system.

The Transport Board also found that the proposal would allow a big reduction of railway establishments at and near Perth Central Station, thereby easing city congestion.

## SOUTH AFRICA

### Suburban Passenger Stock

Improved accommodation is now available for suburban and inter-urban passengers on the Witwatersrand-Pretoria-Vereeniging inter-connected system; the new stock, built by the Metropolitan-Cammell Carriage & Wagon Co. Ltd. is described elsewhere in this issue. One class of accommodation for Europeans and two classes for non-Europeans are provided at reduced fares. The new coaches are of two main types, trailers seating 60 or more passengers and with standing room for about 120, and motor coaches seating a smaller number.

## BELGIAN CONGO

### Extension of Electrification

The first section, from Tenke to Lubidi, of the extension of electrification of the 3-ft. 6-in. gauge Bas Congo-Katanga Railway from Tenke to Luena, 114 miles, is expected to be in operation at the end of this year. Electric working at 50 cycles over the first section of the B.C.K. Railway to be converted from Jadotville to Tenke began in October, 1952; conversion of the section from Tenke to Kolwiz was completed in December, 1953, and that of the Elisabethville-Jadotville section in July, 1956, by which time 214 route-miles had been electrified.

## CANADA

### Large Motorcar Vans

The largest consignment of motorcars ever to be handled in a single railway vehicle—10 British-built Van-guards—has been conveyed from Halifax to Montreal in one of the Canadian National Railways new motorcar vans. These vehicles are 75 ft. long and more than 16 ft. high overall. As such they are believed to be the largest enclosed vehicles on any railway in the world.

### Diesel Operation in East Africa



Freight train on the Magadi branch, headed by two "85" class diesel-hydraulic locomotives built by the North British Locomotive Co. Ltd.

### New Toronto Underground Line

Plans for a new east-west underground railway have been submitted to the Toronto Municipal Council by the Toronto Transit Commission. The project is estimated to cost some \$182,000,000, of which \$30,000,000 would be spent on rolling stock and workshop equipment. There would be 20 stations and a marshalling yard. It is estimated that the line could be in operation by 1962, carrying 268,000 passengers a day.

## VENEZUELA

### Caracas Underground Railway

Preliminary studies for the building of the Caracas underground railway system have been completed by a private company appointed by the Venezuela National Railways Administration. The plans are based on the Paris Métro system. It is estimated that the cost of carrying out the scheme will be some \$200,000,000.

## ARGENTINA

### Survey of Rolling Stock

A survey of the state of rolling stock made recently by the Argentine State Railways shows that of the steam locomotives at present in use, only 24 per cent are giving good service, 39 per cent are considered satisfactory, and 37 per cent are in such a condition that it would be desirable to withdraw them from service.

Of the 3,831 steam locomotives owned by the railways, only 5 per cent are less than 20 years old, but 71 per

cent are between 41 and 60 years old.

The condition of passenger coaches and freight wagons is also stated to be unsatisfactory. Of the former, which number 4,644, 11 per cent are less than 20, and 54 per cent more than 40 years old. The number of freight wagons available is 83,399, 4 per cent of these being less than 20, and 65 per cent more than 40 years old.

As part of a modernisation programme, the railways are to buy, during the course of this year, 280 diesel-electric locomotives, 300 diesel railcars, and 2,500 freight wagons.

## PERU

### Projected Line to Serve Coalfield

Engineers from the Ministry of Development & Public Works, Lima, have been studying the route for a proposed new railway line linking the coal-mining centre of Goyllarisquiza and the port of Pucallpa in the Amazon basin. A connection with the city of Huánuco is also envisaged.

## UNITED STATES

### Pullmans on the New York Central

It was stated in the February 28 issue that the New York Central System, in taking over the servicing of its Pullman cars from the Pullman Company, presumably would have to purchase from the latter the cars still needed to maintain its Pullman service. The New York Central, however, actually owns the 370 Pullman cars that it uses. They have been leased to the Pullman Company. The rental paid

by the latter fell short by \$814,667 in 1956 of the amount paid by the New York Central for Pullman crews and car maintenance cost has compelled the present decision. The New York Central from now on will maintain its cars in its own shops and hire the necessary staff to man them. The Pennsylvania has a similar step under consideration.

If this practice spreads to any extent in the U.S.A., it will threaten the capacity and flexibility of the Pullman pool of cars, and eventually may bring to an end the existence of the Pullman Company itself.

## SWITZERLAND

### Federal Railways Results for 1957

A preliminary statement shows that the total traffic receipts of the Swiss Federal Railways for 1957 were fr. 857,100,000 (fr. 813,000,000 for 1956); passenger traffic receipts were fr. 340,900,000 (fr. 326,600,000); and freight, livestock, baggage, and postal receipts fr. 516,200,000 (fr. 486,400,000). Total receipts amounted to fr. 931,800,000 (fr. 885,500,000) and working expenditure to fr. 669,600,000 (fr. 648,100,000). This leaves a surplus of fr. 262,200,000 (fr. 237,400,000).

## AUSTRIA

### Vienna Monorail Plans

Officers of the Vienna municipal transport undertaking recently visited Cologne to study the full-scale demonstration Alweg monorail, with a view to a similar system in Vienna.

## Publications Received

*Dynamic Instability: Automobiles, Aircraft, Suspension Bridges.* By Y. Rocard, C.B.E., London: Crosby Lockwood & Son Ltd., 26, Old Brompton Road, S.W.7. 8½ in × 5½ in. 227 pp. Illustrated. Price 45s. This translation by Mr. M. L. Meyer of Sheffield University of "L'Instabilité en Mécanique: Automobiles, Avions, Ponts Suspendus" will be welcomed by engineers and scientists engaged in research into problems of stability. The author, who is Professor in the Faculty of Science, University of Paris, and Director of the Physical Laboratory, Ecole Normale Supérieure, applies the theory of dynamic stability to current problems of technical practicality leading to a comparison of theoretical and practical results down to numerical detail. From simple reasoning on the causes of travel sickness and automobile shimmy, he advances to elaborate mathematical analysis with fully worked-out examples of the riding vibrations of the sprung mass of an automobile, carriage suspension, and the directional stability of the pneumatic tyre, the landing gear of an aeroplane.

the flutter speeds of aircraft wings, and the aerodynamic behaviour of suspension bridges. This book will make a valuable addition to the library of anyone studying the complex problems of stability as applied to railways and other forms of transport.

*The Bowater Papers.*—This is the fourth issue of this magnificently produced book, which first appeared in 1950, published by the Bowater Paper Corporation Limited. The volume presents in a pleasing way some of the many aspects of paper making, and includes a number of articles by well-known writers. There are many excellent illustrations in colour and line.

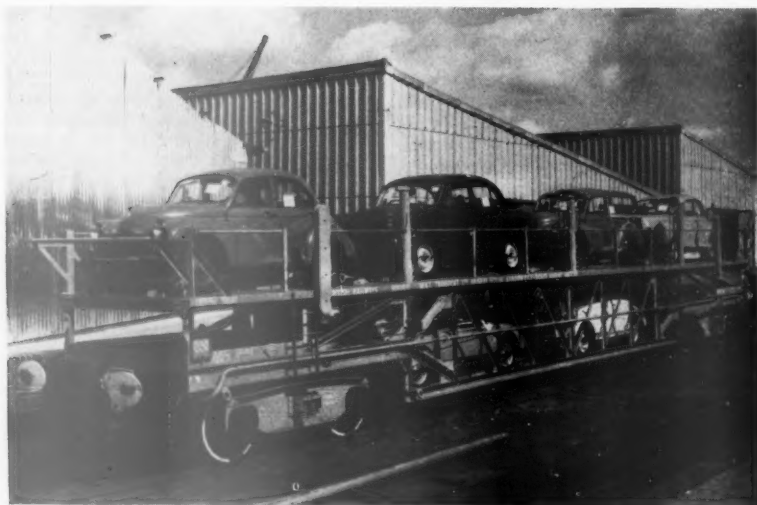
*Jarrah and Karri:* Millars' Timber & Trading Co. Ltd., Pinners Hall, London, E.C.2, has issued a well-illustrated brochure giving the history, properties and uses of these two hardwoods peculiar to Western Australia. Jarrah, one of the most durable timbers, is immune from the effects of damp, dry rot, and other fungoid growths. Its natural resistance to termites and marine borers is great, it requires no treatment of any kind and is extremely

fire-resistant. Jarrah sleepers are used all over the world, and many have been in the road for up to 45 years and are still serviceable. Their remarkable spike-holding qualities enable them to be thinner than other sleepers. This timber is eminently suitable for all kinds of track and bridge timbering, wagon and container framing and flooring, marine and harbour piling, structural framing and decking. Karri, though less durable than jarrah, has immense strength and is specially suitable for superstructural work and is obtainable in great lengths. It can be used for most of the same purposes as jarrah.

*Japanese National Railways Year Book of Information, 1956-57.* Published by the Japanese National Railways, Marunouchi, Tokyo. No price stated.—This 64-page booklet maintains the standard of preceding years. The information relates mainly to civil and mechanical engineering, and to traffic. The 10-page introductory description contains a great deal of useful information. The list of events of 1956-57 includes a reference to electrification of the Tokaido Line.

## Two-Tier Motorcar Transporter

*Hand-operated hoists for easy loading of vehicles*



*Two-tier transporter fully loaded with six motorcars*

**A** TWO-TIER motorcar transporter, the first of its kind to be built in this country has been tested and proved successful in regular use on British and Continental railways.

The prototype was developed for the M.A.T. Transport Limited by Newton, Chambers & Co. Ltd., in consultation with British motorcar manufacturers.

The idea of making a motorcar-carrying railway wagon, similar in principle to the two-tier road transporters now widely used in this country is not new. Wagons of this kind have been in use on some European and American railways for some years and have been suggested for use in Britain many times, but until recently it has generally been regarded as impracticable, mainly because of the restricted heights and the width of the railway loading gauge in this country.

M.A.T. Transport Limited is an official agent of British Railways Continental freight services and was there-

fore anxious to have a wagon capable of carrying the maximum number of vehicles suitable not only for the restricted British loading gauge, but also for operation on all European railway systems. It was with these requirements in mind that the manufacturers developed the present design, which complies fully with British Railways requirements with regard to running gear, and it has also been passed by the Wagon Standards Committee as complying with R.I.V. regulations, and is therefore suitable for running in the Continent of Europe.

### Wagon Construction

The wagon uses a well frame supported on two four-wheel bogies. It measures 60 ft. 8½ in. long over the buffers and can accommodate a total load of 10 tons in the tare weight of 25 tons. It can negotiate curves of 70-ft. radius, and is suitable for speeds up to 70 m.p.h.

Fully automatic Westinghouse compressed-air brakes are fitted to all wheels, and a through pipe is fitted for vacuum brakes. Provision is made for the ready fitting of vacuum brake cylinders should these be required.

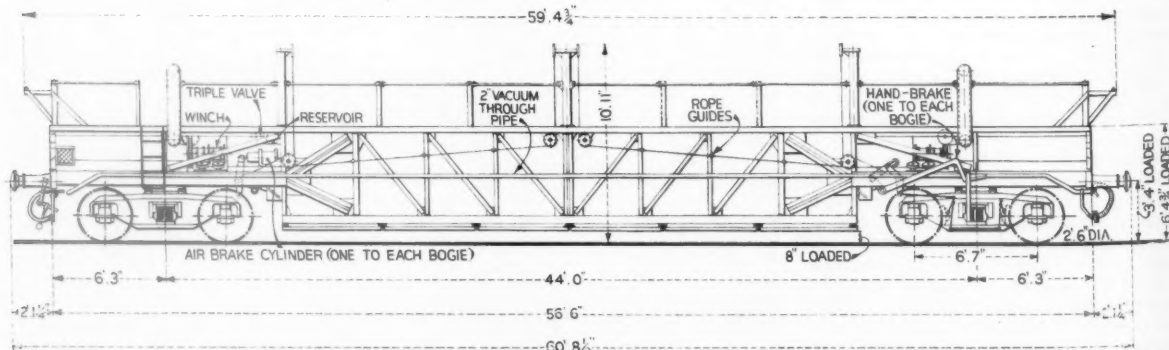
### Loading Hoists

Loading is arranged in two tiers, one in the well to accommodate two motorcars and the upper deck to accommodate four average size or five very small motorcars. The main feature of the wagon is in the two hand-operated platform hoists which form the centre portion. With the hoists in the travelling position, there is a continuous flush deck from one end to the other. When raised the top and bottom decks come together so providing access to the lower deck.

Loading is carried out from the top deck by means of an inclined ramp at either end of the wagon. A motorcar is driven up the ramp and secured in position on the bottom platform of the first hoist, which is lowered. The top platform of the hoist then becomes flush with the top deck, and the second motorcar is driven into position on the second hoist which is also lowered. With two motorcars in the lower deck the top deck is free for loading with motorcars of almost any size. In the lowered position the platform is carried on the wagon framework, so relieving the hoist cables of any load. The height of the top deck is such that the largest saloon cars can be carried inside existing loading gauge limits. The two hoists are independently operated by hand winches. A motorcar can be raised from the well to the unloading position by two men in about six minutes.

The possibility of using power-operated winches is now being considered by Newton Chambers & Co. Ltd., and another possible development is to sheet-in the wagon completely so that all vehicles being carried are protected from the weather.

Since being brought into regular  
(Continued on page 304)



*Side elevation of transporter, showing arrangement of loading hoists and principal dimensions*

## The Effects of Mining on British Railways

*Legislation, and the causes and prevention of damage by subsidence*

THE variety and widespread distribution of coal and other minerals mined in England, Scotland, and Wales is well known, but it is not always realised that over the coalfields alone run nearly 400 route-miles of main-line railway and many times that mileage of secondary and branch lines. Consequently, there are several thousands of miles of track liable to suffer the effects of subsidence, besides tunnels, viaducts, overline and underline bridges, stations, warehouses and other buildings, engine-sheds, turntables, coaling plants and signalboxes among other structures.

There has been an abundance of legislation to deal with the working of minerals under or in the immediate vicinity of railways, and to strike and preserve an equitable balance between these sometimes conflicting interests.

### Legislation

In the earliest days of railways possession of all substances lying below them usually passed to the railway company with the right of support for the surface. However, in many railway Acts before 1845, the conveyance of minerals to the railway was specially excluded but the mine owner had to give not less than 30 day's notice of his intention to work within 40 yd. of the railway land boundary.

The Railway Clauses Consolidation Act, 1845, standardised conditions applying to all subsequent railway Acts in its sections known as the Mining Code. Under it a railway company could purchase minerals only if this right was expressly mentioned in the relevant conveyance, and the mine owner had to give the notice referred to above. If the railway wished to protect its property from damage caused by nearby working it could, within the 30-day period, prevent such working, but it had to compensate the mine owner for loss incurred in leaving the minerals unworked. The railway could also subsequently prevent the working of unworked minerals within the 40-yd. limiting distance by paying compensation.

Later, it was found that with increasingly deep working, the 40 yd. distance was insufficient to assure lateral support for the railways in all cases, and the railway companies often had to sterilise minerals outside that limit, paying compensation to the mine owners. In 1912, however, a House of Lords judgment ruled that the railway had a Common Law right of support outside the 40 yd. limit without paying compensation, and large areas of minerals adjacent to railway property were sterilised. As a result many individual agreements were entered into between railways and colliery owners; financial provisions in these agreements allowed for the companies Common Law rights in that coal.

So numerous were these agreements that in 1915 a standard practice was devised applying to most cases, and this was legalised by the passing of the Mines (Working Facilities & Support) Act, 1923. This substitutes for the rigid 40-yd. limit an "area of protection" depending on local conditions. This area of protection is divided into an inner area—under railway property and within 40-yd. of it—and any outer area of protection deemed necessary. The mine owner receives full compensation for sterilised minerals in the inner area and one-third of the full rate for those

formed Railway Executive and the Coal Board, simplifying the provisions of the Mining Code and securing closer co-operation between them.

### Causes of Damage to Railways

To appreciate the causes of damage to railways it should be realised that coal is mined at very different depths, overlaid with various depths and kinds of rocks, and is itself in seams of different thicknesses; some seams are on the surface and others half a mile below it. Also, the methods of extraction should be understood.

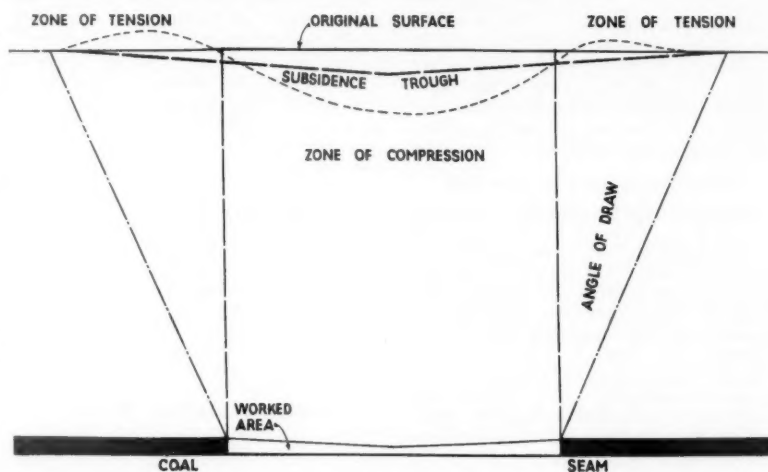
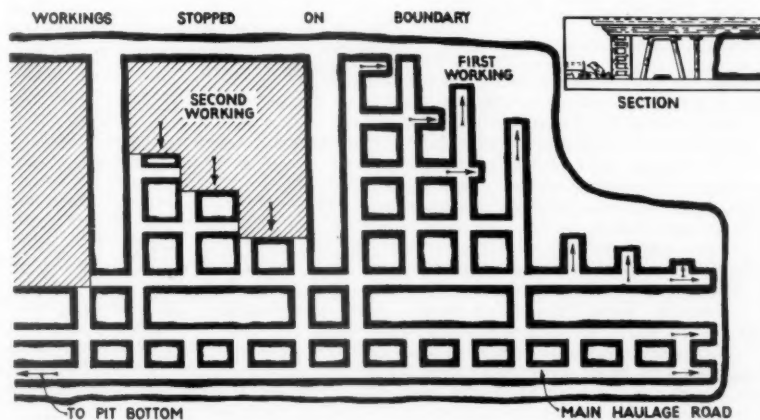


Diagram of subsidence, showing the draw and zones of tension and compression

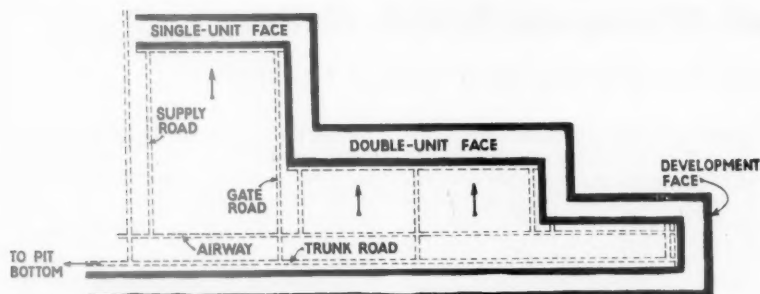
in the outer area. Though this Act puts all "interactings" on a business footing, a spirit of compromise has been required in many instances in its practical application.

With the nationalisation of both railways and coal, an agreement was reached in 1949 between the newly

There are two main methods of coal mining: (1) the pillar and stall, and (2) the longwall method. Fundamentally, the former method consists of driving a series of narrow headings or stalls in the coal parallel to one another and connecting them at intervals with cross-cuts, so as to form the seam into a



Pillar and stall method of working



Longwall method of mining with advancing conveyor roadways

series of roughly-rectangular areas, the pillars, as illustrated. The stalls are usually about 12 ft. wide but may vary from 8 ft. to 20 ft. The pillars also may vary from 10 yd., measured along the side, to 100 yd.; they may be left in for all time, but are more often extracted wholly or partly as conditions permit. The pattern of working varies greatly according to underground conditions, and the use of cutting, getting and transporting machinery.

#### Longwall Method of Working

In the longwall method of working the seam is extracted on a broad face by a continuous face or wall advancing outwards from near the shafts towards the boundary of the colliery take. The transport and ventilation roadways to the working face are shown in an illustration.

With mechanical coal-cutters and conveyors the tendency is to limit the length of the working face to about 200 yd. and advance this at the rate of 400-500 yd. a year. This practice makes it possible to produce as much coal from a 200-yd. mechanical face as it was from a face 1,000 yd. long in hand-gotten days, and so substantially reduce the number and maintenance of winning roadways.

When coal or other minerals are worked by either of these methods

movement of various kinds and extents generally results, not only on the ground directly over the working area, but also adjacent to it. A diagram shows the movement on the surface due to the extraction of an area of coal in a single seam. The extent of "the draw" should be noted, and also the zones of compression and tension. Horizontal movement of the surface almost always accompanies settlement. The amount of subsidence varies greatly as does the rate of settlement, from a few weeks to several years.

The case illustrated by the diagram is straightforward and can be foretold, but previous workings in other seams, beds of sand and similar substances, and faulting in the rock strata may cause eccentric settlement of the surface. Railways are particularly prone to suffer severe and cumulative damage from subsidence.

#### Damage to Railway Property

This can be considered as affecting (a) the track and (b) other works associated with it. Severe damage to the track may result from the working of a thick seam at shallow depth, whereas a thin seam at considerable depth is likely to cause only slight, gradual and widespread subsidence. The extraction of several seams under the same length of track produces a cumulative effect and

often sets complicated problems for the engineer.

Tunnels, viaducts, and arch-bridges are the structures most vulnerable to subsidence; steel-span bridges are less so. Many steel-decked overbridges have subsided so much that in the process of raising the superstructure over a period of many years to maintain headroom, the original bedstones lie buried below formation-level; yet these bridges have continued in service without interruption and with perfect safety.

#### Preventative and Remedial Measures

Each Regional Chief Civil Engineer has under him a mining organisation specialising in the field of subsidence damage. It investigates all cases of workings threatening the railway and assesses their probable results on way and works, reporting on the extent and depth of the subsidence, its rate and likely duration. Measures are taken to counteract them, but there are limits—both physical and economic—to what can be done to obviate or reduce damage and it is then that the reservation of support underground is essential.

The area of a pillar of coal that may have to be sterilised in any one seam to support an over- or under-line bridge may be many more than 100 times the area of the bridge. In one instance where a bridge carried a double-line railway over seven other tracks, the pillar of coal required to support it in a seam at a depth of 400 yd. and 5 ft. thick contained 130,000 tons of coal.

Every effort is made by the mining engineers responsible for such underground support to reduce the size of the supporting pillars and sterilise as little coal as possible, but this is not the only national interest involved. Consideration must also be given to the safety of the railway, and the continuance without interruption or delays to its flow of traffic in the interest of the national welfare and economy.

#### Two-Tier Motorcar Transporter

(Concluded from page 302)

service, the prototype has been used in taking loads of motorcars from the Cowley works of the British Motor Corporation, to Cologne by the Harwich-Zeebrugge train ferry of British Railways, Eastern Region. On the return journey it brought German vehicles into Britain.

At one point in the journey from Oxford to the coast the wagon traversed the London area using the Metropolitan Line tunnels. Here the loading gauge, with 12 ft. 8 in. minimum height, is less than normal in this country, but the design had been completed to meet such usage, and so no difficulty was experienced.

There was no trouble in the early months of regular service, and the pro-

totype has not required any modifications. A further 12 wagons of the same design have been ordered by M.A.T. Transport, Limited.

**PROVISION FOR GROWING TRAFFIC AT HEYSHAM.**—To expedite the growing container traffic between Great Britain and Northern Ireland, site work has begun at Heysham Harbour on installation of two new full portal electric cranes on the North Quay; one crane will be of 12 and the other of 7½ tons capacity. Crane sidings, roadways, lighting, electric capstans and new staff accommodation are also being constructed by British Railways, London Midland Region, as part of the scheme to improve the shore handling equipment at the North Quay. Five new marshalling sidings are being provided. These improvements will operate in conjunction with two new container ships, one of which, the Container Enterprise, has

already been launched. On the South Quay similar improvements are to be made to facilitate the loading and unloading of general cargo ships. There will be two new 7½-ton semi-portal electric cranes, with associated trackwork, capstans, and lighting.

**ELECTRIC TRACTION AND SIGNAL EXHIBITS AT BRUSSELS WORLD EXHIBITION.**—On the stand of the British Electrical & Allied Manufacturers' Association in the British Industrial Pavilion at the forthcoming Brussels World Exhibition British achievements in electric traction will be a special feature. A massed display of electric locomotive models in the liveries of many overseas countries will call attention to the world-wide demand for British locomotives, and a large number of photographs will show other aspects of the application of electricity to railway working. An overhead gantry will carry a number of sets of railway signal lights, which will operate in an appropriate sequence.

## ELECTRIC RAILWAY TRACTION SECTION

### Suburban Trains for S.A.R. Reef Services

**R**EVENUE service operation of the first few of the 349 electric coaches being contracted for the Reef suburban services of the South African Railways by the Metropolitan-Cammell Carriage & Wagon Co. Ltd. was commenced at the beginning of last month. This order includes motor and trailer coaches totalling 105 and 244 respectively; the main items of electrical equipment are being supplied by the Metropolitan-Vickers Electrical Co. Ltd.

The general construction of these coaches, the subject of an article on page 306, is of the integral tubular principle. The shell is treated as a rectangular tube with rounded corners, stiffened at intervals in its length by lateral rings formed by the crossbars, bodyside pillars, and so on. These rings are maintained in position by the continuous longitudinal stiffening members such as cant-rails, bodyside rails, purlins, and solebars. All these members are welded at the joints with other members and also to the outer skin; the whole forms the self-supporting and load-carrying body shell. The method of calculation, which involves a considerable amount of work, is described in the article. Comparatively recent techniques of stress analysis and strain gauging are employed to allow the cars, particularly the trailers, to be as light as possible, commensurate with adequate strength, to carry the heavy peak loads specified by the railway management. As a result, the trailer shell which weighs around 10 tons can support a loading of 33 tons. The body shell, which is the load-carrying structure, accounts for only a small percentage of the tare weight. For instance, only 20 per cent of the weight of the motor coach is taken up by the actual shell, whereas nearly 70 per cent is represented by electrical equipment and bogies, the remaining 10 per cent being interior finish and seats. These low proportions illustrate clearly the value of using the method of stress analysis and strain gauging for design calculations, despite the increased drawing office time which is incurred thereby. Corten steel, which has been used for all structural items, combines a good resistance to corrosion with improved mechanical properties.

The underframes of the trailers are constructed from folded or drawn sections for solebars and crossbars. Conventional longitudes have been dispensed with in these vehicles. The crossbars run between solebars; underneath a longitudinal troughing, which takes most of the buffing loads, is welded. To help the distribution of buffing loads from the end longitude to the solebars, bolster and thence to the troughing, a cross beam has been fitted between the bolster and the headstock. In the construction of the end framing, greater strength has been afforded as protection against telescoping in the event of a collision. This method of designing lightweight integral steel structures by stress analysis and strain gauging was mentioned in the paper to the Institute of Transport, Metropolitan Section, by Mr. L. B. Alexander, London Manager & Special Director of the Metropolitan-Cammell Carriage & Wagon Co. Ltd. Editorial comment on this paper was made in last week's issue.

The electrical equipment supplied by the Metropolitan-Vickers Electrical Co. Ltd. is generally similar to that of the earlier vehicles for the Reef system described in our June 10, 1955, issue. It may be recalled that in those trains the motors are forced-ventilated so as to provide adequate cooling at the high altitude (6,000 ft.) of the Reef lines. The new motor coaches are equipped with booster fans for the same purpose, but the traction motors are also arranged for self-ventilation, the forced draught being brought into use by the driver to supplement the cooling when necessary.

Division of the electrical equipment between the interior of the motor coach and the underframe corresponds with

that in the earlier Reef stock; the main switchgroup frame and low-tension cubicles are housed in compartments which are slightly pressurised to exclude dust, while the rotary machines and main resistances are underframe-mounted. The rotaries no longer include a motor-alternator for fluorescent lighting, the supply for this purpose being now taken from the 110-V. d.c. auxiliary system fed by the motor generator. This method has also been adopted in the recent multiple-unit stock with Metrovick equipment for the Cape Western system, and necessitates provision for reversing the lighting current at intervals in order to prevent end-blackening of the tubes. A convenient method of ensuring that this is done regularly while the stock is in service is to make the process automatic when the direction of travel of the motor coach is reversed. Provision for photocell control of lighting in these vehicles is a refinement less usual in electric rolling stock than thermostatic control of heating; but its adoption may be considered a logical step in the process of offering the railway traveller standards of comfort and convenience which are on a par with those of other services to the public.

### Standard Locomotive Classes in Germany

**I**N selecting locomotive designs to replace prewar types on its electrified system, the German Federal Railway has not eliminated the Co-Co wheel arrangement, but has confined its use to heavy freight duties. Three Bo-Bo classes cover all other traffic from heavy fast passenger to medium freight trains, and one of these, the 66-ton "E41," has a sphere of usefulness overlapping part or all the work of three earlier locomotives. The basic design, however, is the "E10" derived from the Bo-Bo prototypes described in our issues of September 25, 1953, and May 14, 1954.

This is an 84-ton design for heavy and medium express duties at speeds up to 87 m.p.h. A change of gear ratio, restricting the speed to 62 m.p.h., produces the "E40" class of similar weight for heavy stopping passenger and medium freight trains. The "E10" and "E40" classes are identical from the point of view of maintenance. Many of the same components are used in the lighter "E41" class, which was required partly to replace the earlier "E71" secondary-line locomotive. The 126-ton "E50" heavy freight Co-Co locomotive is designed to haul a train of 1,600 tons on a gradient of 1 in 100 at speeds of 40-43 m.p.h.

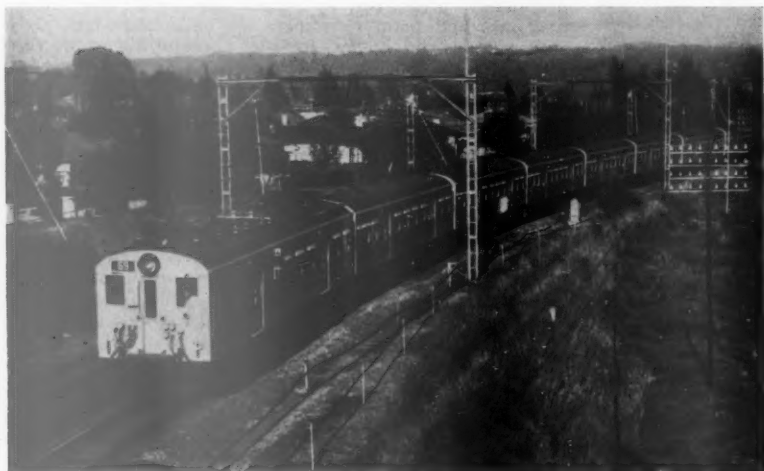
It is interesting to compare the foregoing types with the one basic 80-ton Bo-Bo design so far announced by British Railways for the 50-cycle electrification. Here, also, alternative gear ratios will allow a wide range of duties to be covered, but the mixed-traffic Type "B" locomotive is not apparently required for quite such heavy trains as the German "E50," its specification calling for the ability to haul mineral trains of up to 1,250 tons at 55 m.p.h.

If heavier and longer trains were considered desirable, and were a convenient operating proposition with vacuum-fitted stock, a six-axle design might have been necessary for British Railways. It would be an overstatement to attribute the use of two designs in this country, as against four in Germany, entirely to the characteristics of rectifier locomotives.

It is in any case still too early to claim that the "A" and "B" types for British Railways will cover economically a programme of duties as wide as that entrusted to the three German Bo-Bo designs, for the need may well be felt in practice for an intermediate locomotive in the 65-ton range corresponding to the German "E41" class.

## Electric Suburban Trains for S.A.R. Reef Services

*Metropolitan-Cammell-built sets of  
lightweight integral construction*



*Multiple-unit suburban set of lightweight integral construction; built by Metropolitan-Cammell for service on South African Railways Reef system*

**DELIVERY** of the 349 electric coaches being built for the Reef System of the South African Railways was commenced during the last few months of 1957. Running tests were successfully completed by the end of January, 1958, and the new coaches were placed in regular service at the beginning of February, 1958, as planned. The main contractor for the design and manufacture of this order is the Metropolitan-Cammell Carriage & Wagon Co. Ltd.

Of the total, 105 are motor coaches and 244 are trailer coaches. Seventy of the motor coaches and 123 trailers are being built at the main contractor's Midland Works, Washwood Heath; the remainder, 35 motor coaches and 121 trailers, by the Birmingham Railway Carriage & Wagon Co. Ltd., of Smethwick. Metropolitan-Vickers is the sub-contractor for the main electrical items of all coaches.

The trains are designed to run from a 3,000-V. d.c. supply from overhead wires and can be operated from the cab at either end of the train. A typical eight-coach train consists of six trailer coaches with a motor coach at each end. The main dimensions of the vehicles are as follow:—

	ft.	in.
Length over body and panels ..	60	3½
Width over body panels ..	9	3
Centres of bogies (motor coaches) ..	41	0
Bogie wheelbase (motor coaches) ..	9	0
Centres of bogies (trailer coaches) ..	44	6
Bogie wheelbase (trailer coaches) ..	6	9
Gauge ..	3	6

Of the 105 motor coaches, 60 have upper class accommodation, 10 have a guard's and baggage compartment with upper class "reserved," and 35 have a guard's and baggage compartment with third class accommodation. The term

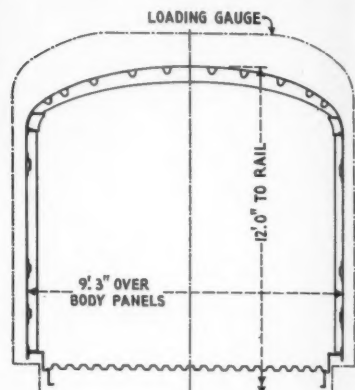
"reserved" refers to accommodation for non-Europeans. The 244 trailer coaches are sub-divided into 178 upper class, 33 upper class "reserved" and 33 third class.

The general layout of the various types of cars can be seen in the accompanying drawing. The seating accommodation in the motor coaches is, upper class, 48; upper class with van, 40; third class, 36. In the trailers it is, upper class, 62; third class, 60.

### Body Construction

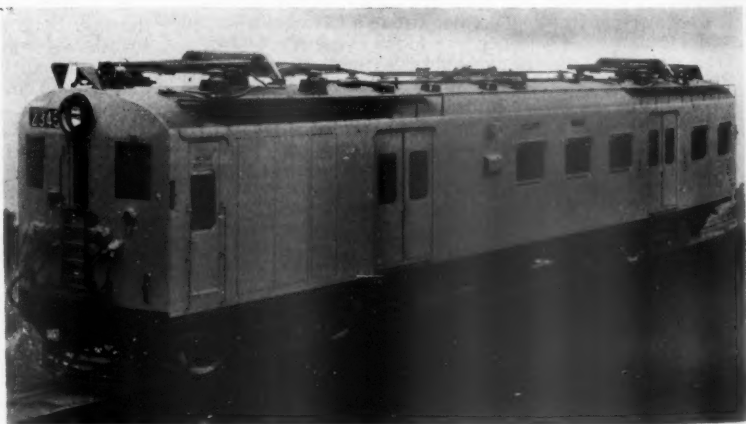
The general construction is based on the integral tubular anti-telescopic principle, which is to consider the whole body shell as a rectangular tube with rounded corners, stiffened at intervals in its length by lateral rings

formed by the crossbars, bodyside pillars and carlines. These lateral rings are maintained in position by the continuous longitudinal stiffening members such as cantrails, bodyside rails, purlins and solebars. All these members are welded at the joins with other members and also to the outer skin, the whole forming the self-supporting and load carrying body shell. A cross-section of the car is shown in Fig. 1. The designs, which have been checked by calculation at every stage of their development, were carefully prepared

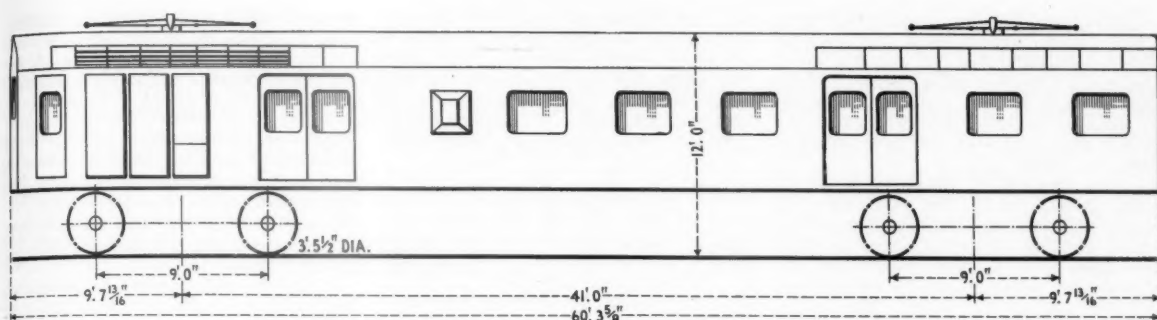


*Fig. 1—Cross-section of integral construction body framework*

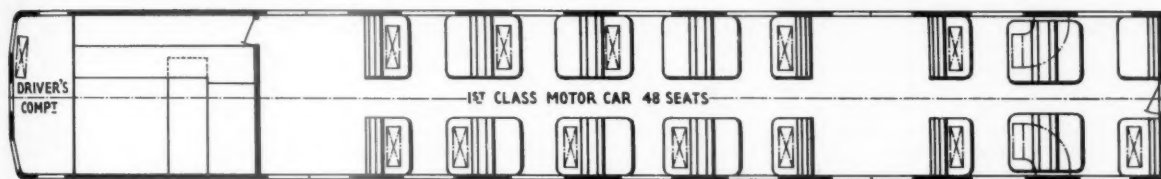
to give lightness to the trailer cars and, commensurate with adequate strength, to carry the extremely heavy peak loads specified, together with the 200-ton end loading. It is interesting to note at this point that the trailer coach shell weighing just under 10 tons will support a loading of over 33 tons.



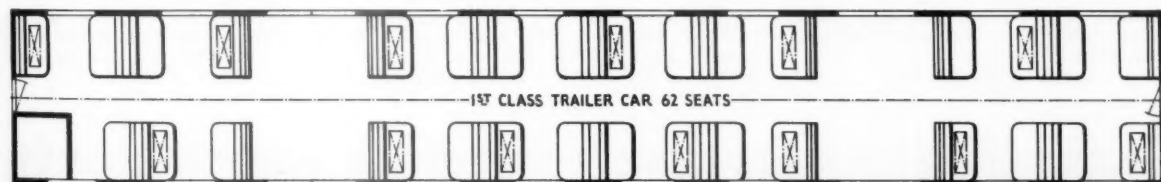
*First-class "reserved" motor coach with baggage compartment*



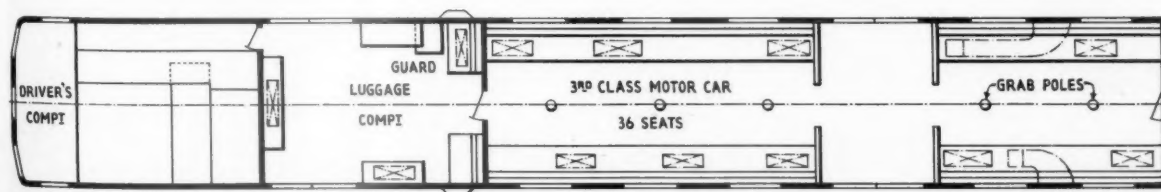
*Elevation and plan of first class motor coach ("reserved") with baggage compartment*



*First class motor coach, showing transverse seating*



*Seating arrangement for 62 persons in first class trailer: the layout is the same in "reserved" and "non-reserved" vehicles*



*Third class motor coach with luggage compartment, showing lengthwise seating*

The underframes of the trailer coaches are built up from folded or drawn section for the solebars and crossbars with a strong longitudinal troughing below the crossbars which is stitch-welded to the solebars. This troughing is 16 s.w.g. whilst the solebars and crossbars are respectively  $\frac{7}{8}$  in. and  $\frac{1}{2}$  in. The crossbars run continuously from solebar to solebar and conventional longitudines do not exist. A cross beam has been added

between the bolster and the headstock to deal with the buffing loads from the end longitude and to distribute these loads between solebar and bolster, and thence to the troughing which is the main member dealing with buffing loads.

The headstocks are channel sections and made from  $\frac{7}{8}$ -in. rolled plate. A large over-rider casting has been secured to the headstock in the centre in order to prevent the couplers from

separating vertically in the event of a collision and thus minimising the risk of telescoping.

The bodysides are built up from drawn sections which make up the main framing members to which the 14 s.w.g. panels are spot-welded. Body pillars, cantrail and cribrails are in 12 s.w.g. whilst longitudinal rails are 14 s.w.g. All framing members both vertical and horizontal are continuous and body pillars are notched as

required to pass the longitudinal rails. The panels are pressed for window openings and doorways, and are automatically seam-welded before being spot-welded to the framing. Shallow "tophat" sections are used for the horizontal rails and modified channels for the pillars.

The principle of the roof construction is similar to the bodyside; the carlines, which are individual pressings from cantrail to cantrail, are notched to allow the purlins which are V-sections to be continuous from one end of the roof to the other. The frame members are welded to each other and stitch-welded to the roof sheets.

The end framing is somewhat more rigidly constructed because of the possibility of collisions, although folded and drawn sections are still used in conjunction with 14 s.w.g. panels.

The problem of corrosion has been particularly kept in mind during the design in order to eliminate as far as possible structural conditions which would be favourable to corrosion. In addition the inside of the body shell is given coats of bitumastic paint before sprayed asbestos is applied. All window pockets are lined with zinc trays with direct outlet tubes in order to deal adequately with the heavy rainfall which is experienced at times in South Africa. To assist in corrosion resistance Cor-ten steel has been used for all the structural items.

The foregoing describes the structure of the trailer coaches; motor coaches, however, are very similar above the solebars, although below this level the underframe has been strengthened to carry the heavy items of electrical equipment.

A careful stress analysis was conducted at every stage of the design,

and the following is a brief description of the methods employed.

The complete determination of stress and deflection characteristics of any coach structure involves a number of complex problems; in this particular contract such calculations were more

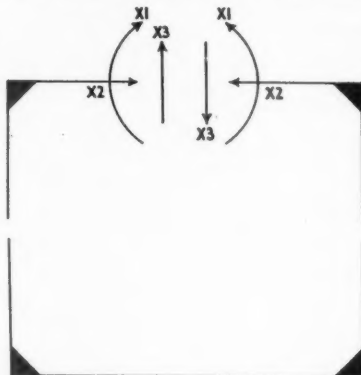


Fig. 2—Diagram of forces considered for calculations on frame structure

than ever necessary in view of the exacting requirements, relating to weights and strength, imposed by the S.A.R.

Most important amongst various loading conditions considered were the following:—(a) Vertically applied loads due to structure, equipment and passenger weights, representing in one case a load of 33 ton; (b) horizontal loading due to traction, braking and buffing forces. In this load category all coaches had to be proved capable of withstanding a minimum of 200 ton applied at the centre coupling without damage. At end loadings, above this

figure it had to be arranged that damage should first occur in the areas between bolster and headstock before any damage occurred between bolsters.

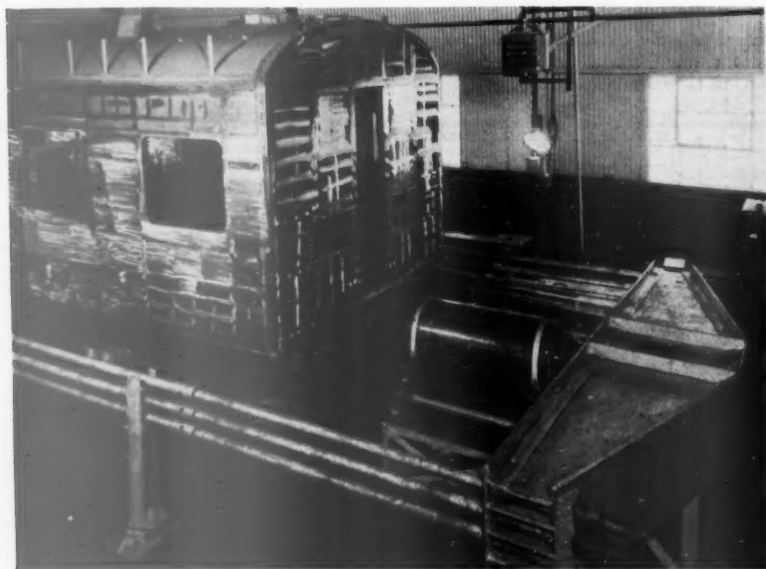
#### Calculations

In these calculations of the basic structure all interior finish and furnishings were neglected, and the steel shell represented as a Vierendeel or rectangular-framed truss simply supported at two points coinciding with the centre pivots.

It has been shown by the contractor that in the horizontal plane the unity of the main structure is impaired by the opening required for doors and windows, and that deflections under vertical loads take place about two horizontal neutral axes; one of these is located above windows and doors, within the group of members formed by the cantrails, purlins, upper bodyside sheets and roof sheets; the other being within the lower structure below doors and windows. Vertical connections between these two main groups are formed by the pillar structures and quarter panels whose neutral axes complete the representation of the structure as a series of rectangular frames, which can be solved by mathematical analysis.

Because of the high loads to be applied to these coaches, it became obvious that the most accurate and practical method of analysis would have to be employed if all unnecessary weight was to be eliminated without endangering basic strength. Accordingly the calculations were based on the theory that the external work done by the loads deflecting the structure would equal the sum of the internal work stored in all the members.

As a first step one member in each



Application of a 200-ton end load testing body structure at Metropolitan-Cammell works



Shell of a trailer coach, showing features of construction

rectangular frame was assumed to be severed at its mid-point and sufficient forces introduced at that point to represent completely the function of the continuous member (see Fig. 2). This involved three forces  $X_1$ ,  $X_2$  and  $X_3$  capable of simulating any condition of bending, shear or direct force in the member.

The external loading was then applied to the structure, and the resulting deflections at each cut or break were equated to the component deflections induced at the same cut by unit loads applied in the position and direction of the unknown  $X$  forces. Thus a series of simultaneous equations was evolved, the unknown  $X$  forces representing the magnitude of forces introduced into the primary structure. Thus it may be stated:—

$$Xa.\delta a.a + Xb.\delta a.b + Xc.\delta a.c \dots = -\delta a.o \dots (1)$$

Where  $\delta a.o$  is deflection in direction of  $Xa$  at a point where  $Xa$  acts when all external loads are applied to the structure;  $\delta a.a$  is deflection in direction of  $Xa$  at a point where  $Xa$  acts when unit load is applied at  $Xa$ ;  $\delta a.b$  is deflection in direction of  $Xa$  at a point where  $Xa$  acts when unit load is applied at  $Xb$ ; and so on.

The values of  $\delta$  were calculated from the following standard equation of work:—

$$\delta a.b = \sum \left[ \int_0^l Ma.Mb. \frac{ds}{EI} + \int_0^l Pa.Pb. \frac{ds}{EA} + \int_0^l Qa.Qb. \frac{ds}{GA} \right] (2)$$

Where  $Ma$ ,  $Pa$  and  $Qa$  are bending moment, direct load and shear force respectively in length  $ds$  of any member of the frame caused by the application of unit force in position of  $Xa$ ; and  $Mb$ ,  $Pb$  and  $Qb$  are similar quantities due to the application of unit force in the position of  $Xb$ . The summation embraces all members affected by both  $Ma$  and  $Mb$ .

The above terms involving deflection due to shear forces and direct forces have a minor influence and they were eliminated. Therefore

$$\delta a.b = \sum \int_0^l Ma.Mb. \frac{ds}{EI} \dots \dots (3)$$

It will thus be seen that three unknown forces resulted from each bay of the bodyside structure, involving a somewhat lengthy series of equations, and these were successfully solved by recourse to the Gauss tabular method, suited to slide rule or calculating machine.

Having obtained the true values of all  $X$  forces, these were applied to their respective positions and the internal distribution of bending moments, shear forces and direct loads plotted. The calculation of stresses then became a straightforward matter using standard formulae.

Once the internal bending moment distribution was known it was also possible to calculate the deflection of any point quite simply by applying unit load in the direction and position at which

the information was required. The bending moment induced by the unit load was then integrated with the moment due to the loading conditions being considered, and the following information was obtained.

$$\Delta = \sum \int_0^l Mu.M \frac{ds}{EI}$$

where  $Mu$  is bending moment due to the application of unit load at point being considered; and  $M$  is bending moment in any member due to loading condition under consideration.

It is perhaps worth noting that the results obtained by using these methods proved a good guide to the behaviour of the first coach under actual strain gauge testing, when no weakness in the basic structure was found.

### Vehicle Weights

As an indication of the results achieved by the design and calculations the following are the final weights obtained for these coaches:—

	Ton	Cwt
*Trailer coach (complete)	30	9
*Motor coach (complete)	60	10
Trailer bogie (complete)	6	1
Motor bogie (complete with motor)	14	16

\* These weights do not include vacuum brake cylinders which are supplied and fitted by the South African Railways.

### Interior Finish

The general interior finish of the upper class coaches is buff-coloured Waverite plastic veneered panels, with self-colour anodised aluminium mouldings and fittings, whilst the ceiling is covered with a lightly patterned p.v.c. veneer. Thus interior painting is not necessary; for cleaning purposes a wipe over with a damp cloth only is required. The upper class cross seats are of tubular type upholstered in blue.

Third class coaches are finished with hardboard panels which are painted, although p.v.c. has again been used for the ceilings on account of standardisation; these vehicles all have longitudinal wooden seats. Ventilation for all cars is provided by Greenwood extractor ventilators in the roof.

Ceilings in all classes of coaches are made up from  $\frac{1}{4}$ -in. Masonite to which has been bonded a p.v.c. veneer. The trailer coach ceiling is semi-elliptical, but in the case of the motor coach there is a raised centre giving a clerestory effect in order to provide accommodation for the air ducts from the cleaned-air compartment at the leading end to the traction motors on the trailing end bogie. These ducts are taken down inside the body finish in the trailing end bay.

### Lighting

Upper class saloons are equipped with fluorescent tubes running centrally down the entire length of the ceiling. The Perspex-covered fittings are finished in self-colour anodised aluminium and operate on 110 V. d.c. supplied from the motor generator set on the underframe. 110-V. d.c. incandescent fittings are used for lavatories and all non-passenger compartments.

In the third class saloons there are incandescent 110-V. d.c. fittings, running centrally down the ceilings. Provision has been made on all cars for the lights to be controlled if required by a photo-electric cell placed on the end finish above cantrail level. This cell is designed to switch the car lights on or off when the light inside the car falls below or rises to a predetermined level. This unit can be switched out of circuit and the lights operated by the normal switches if necessary.

Bodyside drop windows, 3 ft. in sight width, are provided on all cars, and the drop window weight is balanced by a No. 3 Hera equaliser. All windows are fitted with toughened glass sliding in felt-lined channels, and a hair cloth blind is added on all upper class vehicles. A feature of the window arrangement is that the whole assembly of window, balance, guides, blind and interior finish panel below the waist is built into a self-contained window unit, which is readily removable inwards for maintenance purposes. It can be jig-built for interchangeability, its operation not being dependent upon the coach structure, and the whole assembly has been designed so that the blind can be removed without displacing the window unit, which has been finished in self-colour anodised aluminium-alloy to match the remainder of the interior. The equaliser balances the window so that semi-positive stops are not required; a positive stop is, however, provided to enable the window to be locked when closed. All upper class vehicles have an inclined glass vane fitted outside the window to enable it to be lowered a few inches in inclement weather.

### Seating

All upper class coaches have removable back-to-back cross-seat units. They are built up from welded tubular frames, with foam rubber fillings, trimmed with blue Vynide. A stainless steel armrest, trimmed as for the remainder of the seat, is provided at the bodyside, but was considered to be undesirable at the centre gangway in a suburban car particularly at peak periods. The seats are arranged each side of the central gangway and the double seat backs carry a luggage rack constructed of aluminium-alloy, polished and self-colour anodised. These seats allow passengers to stow luggage between the backs at floor level.

Floors of the trailer coaches consist of  $\frac{7}{8}$ -in. t.g. boards laid longitudinally on the crossbars. On top of these boards  $\frac{3}{8}$ -in. linoleum, mottled buff in colour, has been laid with an underlay of cork matting, both of which are bedded in bitumastic adhesive.

Because of the proximity of electrical equipment, the floors in the motor coaches consist of corrugated steel sheeting, the corrugations being filled with cork slabbing set in bitumastic ad-



*Interior of first class trailer, showing fluorescent lighting in roof and vestibule arrangement at door openings*

hesive.  $\frac{3}{8}$ -in. linoleum is laid on top of the cork with the use of bitumastic adhesive, the edges of the linoleum being covered by a sponge-rubber filled stainless steel strip.

#### Doorways and Vestibules

Each bodyside has two large doorways equipped with sliding doors, which open into large vestibules enclosed by four windscreens, designed to provide room for standing passengers. They are equipped with luggage racks on the windscreens and two sets of strap hangers, in addition to the doorway grab poles, sheathed where visible with stainless steel, and the vertical poles in each windscreen. These poles run from carline to under-frame and are intended to be semi-structural.

The windscreen is built up from steel sheet below waist level, with an impressed aluminium panel bonded to it on the doorway face for finish. The saloon face, however, has a Waverite buff veneer, but between waist and cantrail, upper class cars only have a sheet of  $\frac{1}{8}$ -in. toughened plate glass. Above cantrail level the connection to the roof is made by means of a silver hammer stoved finish aluminium alloy casting.

#### Door Operation

All passenger bodyside doorways are fitted with a pair of sliding doors equipped with a Faiveley sympathetic gear to enable them to move in opposite directions when operated. Doors are arranged to be power-closed by the guard, although they can also be closed manually. Opening of the doors is always manual but is subject to the overall control of the guard who can, if he so desires, maintain the air pressure in the door engine and prevent

general door opening. The design allows for the opening of the doors against the air engine in an emergency by the use of some considerable force, but accidental door opening is not possible.

The operation of the door-opening gear, supplied by Faiveley from its Paris factory, is electro-pneumatic. The action of the closing button, situated in the guard's compartment, excites under-frame-mounted relays which operate electro-pneumatic valves fitted in the bodyside at cantrail height between each pair of doorways. These admit air to the door engines. A separate

guard's control box is fitted in the vans to control doors on each side of the train. Indication of the position of the doors is provided at each control box, driver's cab and doorway.

The doors, aluminium alloy castings, are of the trackless type, top hung and designed to give a clear doorway at floor level when they are open. All sliding doors are equipped with a fixed window, and for upper class are finished internally by means of an aluminium panel which has been caustic-etched and anodised. As on the body sides, the lower portion of each door has a stainless steel kicking panel. Third class doors also have the stainless steel kicking strip, but are panelled in mild steel and painted to match the general finish of the coach.

A lavatory is provided in every trailer coach, the upper class being finished in white glossy melamine-faced Waverite, whilst the third class has painted, lead-coated steel sheets. The floors in all lavatories are covered with moulded blue rubber, and the lavatory unit, of stainless steel, is fed from a roof tank of 45 gal. capacity, which is arranged for refilling from both sides of the car at solebar level.

Lavatory window units are on similar lines to those of the saloon, but the balance and blind are omitted. The opaque glass has been arranged to drop 4 in. only.

#### Colour Scheme

The colour chosen by the S.A.R. for the exterior finish of these trains was Smoke Grey to BSS.381/C/1948 Colour No. 692. The roof is finished in bitumastic black, as are also the various body fittings such as lamp brackets and steps. Standard S.A.R. brass gangway gates are provided for moving from one vehicle to another.



*Tubular seat frames carrying light alloy luggage racks in the first class trailer*

Both motor and trailer bogies are of the cast steel equalising beam type, the structural design and springing being by General Steel Castings Corporation. The castings are manufactured by English Steel Corporation, and the items which are of cast steel include the frame, bolster and spring planks.

The bogies are equipped with large diameter cast steel centre bearings with non-metallic wearing plates and sleeves. With the large centre bearings, conventional side bearers are unnecessary, and these are replaced by safety stops which have a nominal clearance of  $\frac{1}{4}$  in. per side.

All bogie springing is by nests of helical springs, damped by Houdaille shock absorbers. In the interests of comfortable riding, the springing has been designed to give maximum deflection under load compatible with the working clearances required between the bogie parts and the underframe.

The radial movement of the bolster is controlled at its outer ends by bolster anchors, which flexibly locate it to the bogie side frame.

In the case of the motor bogies both axles are motorised, the Metro-Vick motors being axle hung, with their noses flexibly mounted onto the bogie transoms.

The bogies are equipped with orthodox equalised clasp brakes operated from the underframes by the usual pull rod linkage. Motor coaches are equipped with four 21-in. vacuum brake cylinders, whilst two 21-in. are sufficient for the trailers.

All bogies are fitted with SKF self-aligning roller bearing axleboxes, the horn clearances being kept to a minimum in both directions.

### Electrical Equipment

Approximately one-quarter of the total body portion of the motor coach length is occupied by electrical and equipment compartments, and access to these can only be obtained by operation of the mechanical interlocking gear. This automatically lowers the pantographs and cuts off the power supply.

The main electrical compartments are the high tension and auxiliary high tension, these being slightly pressurised to prevent the ingress of dust when travelling. The H.T. compartment houses, amongst other items, the main switchgroup frame and this unit has been mounted in such a way that it may be removed directly out of the compartment without being dismantled.

Other equipment is housed in the low tension and various other small cupboards. Two other compartments allow for the intake and filtering of the fresh air supply for cooling the traction motors and this is accomplished by taking in air at the sides of the roof from where it passes down into the air settling chamber. From here it travels through a tank of Vokes filters, which occupy the whole area of a cross partition, and into the air intake chamber proper. This compartment houses the booster fans which can be operated by the driver to force ventilate the traction



*Third class trailer coach of Reef electric sets with adequate provision for standing passengers*

motors when necessary. Air can also be taken from the settling chamber by the traction motors themselves for normal cooling.

The ducts to the bogie at the leading end are taken directly downwards from the air chamber and thence to the motors, but the ducts to the trailing end have to travel upwards and along the spaces provided between roof and ceiling as far as the trailing end bay and thence down the bodysides to the underframe. The cross-sectional area of each duct is some 100 sq. in. The air connections between body and motors are made by reinforced leather bellows.

Current is collected by two pantographs from an overhead wire which has an average potential of 2,900 V., varying on the normal working conditions between 2,700 and 3,200 V. The control is of the electro-pneumatic type employing both unit and drum switches housed in the H.T. compartment and remotely controlled from the master controller in the driver's cab.

The auxiliary supply of control current is obtained from a motor generator set mounted on the underframe, the motor being driven from 3,000 V. line supply, while the generator supplies current at 110 V. In the event of failure of this set, control supply can be obtained from the other motor coach in the train.

The four traction motors are connected electrically in pairs, permanently in series, so that each motor, while insulated for 3,000 V. to earth, has only 1,500 V. across its terminals. The pairs are operated in series or in parallel; one stage of field weakening is provided for which two inductive shunts are used. Provision is made for the isolation of any pair of motors which may become defective without interference with the

working of the remaining motors.

Other items of auxiliary equipment on the motor coach are the exhaustor, compressor and main resistance frames which are all mounted on the underframe.

The sub-contractors include:—

Main electrical equipment	Metropolitan-Vickers Electrical Co. Ltd.
Bogie castings	English Steel Castings Corporation Ltd.
Window gears	Etablissements Georges Klein & Cie.
Door mechanisms	Etablissements L. Faiveley
Self-aligning roller bearing axleboxes	Skefko Ball Bearing Co. Ltd.
Light alloy extrusions	Southern Forge Co. Ltd.
Light alloy castings	Dialloy Limited
Wheels and axles	Taylor Bros. & Co. Ltd.
Warerite plastic veneers	Owen & Dyson Limited
Veneering and bonding	Bakelite Limited
Seats	Insulation Equipments Limited
Brake equipment	Pel Limited
Air filters	Westinghouse Brake & Signal Co. Ltd.
	Vokes Limited

**LONDON-GLASGOW NEW CAR/SLEEPER TRAINS.**—A new car/sleeper train will leave Marylebone for Glasgow St. Enoch each Tuesday, Thursday, and Sunday from May 4 to September 25. Return services are on Mondays, Wednesdays, and Saturdays.

**SYKES WINDOW DISPLAY IN BIRMINGHAM.**—The Sykomatic Magazine Loading Gear Generator will form the main part of a window display, by W. E. Sykes Limited of Staines, Middlesex, being held at the Birmingham Exchange and Engineering Centre, Stephenson Place, Birmingham, from March 10-31. Examples of gears produced by the machine are being shown, with working examples of a double helical gear and a complete sectioned motor vehicle gearbox in which all the gears have been produced by Sykes Gear Generators. In the Centre itself, supporting the window display, a selective range of Sykes spur and helical gear cutters, hobs and shaving tools is being displayed.

## Railway Uses for Radio

*On U.S.A. railways, 2,500 new radio sets are being installed annually*

**I**N the 10 years since the first introduction of radio communication on railways in the U.S.A., its use has extended so rapidly that the latest survey shows it now to be installed on 7,450 locomotives, in 2,754 brakevans of freight trains and at 1,441 lineside radio stations; nearly 3,000 sets of walkie-talkie apparatus have also been purchased. At present 180 different railways have radio in use, and installations of new radio equipment are running at about 2,500 annually, though as yet the total installed has not exceeded 28 per cent of the locomotives, 14 per cent of the *cabooses*, and 15 per cent of the wayside offices in the U.S.A.

The most extensive use of radio communication is in marshalling yards, where it is employed to enable yardmasters to keep in touch with their shunting engines. Firms in the vicinity having loaded wagons ready for the dispatch to the yard in the same way can obtain the speedy services of a shunting engine for their collection.

### Freight Train Operation

Because of the length of the average American freight train, which in extreme cases may be a mile or more, the savings in time made possible by direct radio communication between the train crew, at the rear end, and the locomotive crew are very considerable. On one 1,300-mile single-track main line, the aggregate saving effected, chiefly in the time spent in entering and leaving siding tracks, has been about 5½ hr. in the running of every freight train over the length of the line. On other railways the expedition of freight working so brought about has made it possible to conduct its operation with fewer locomotives.

Train-to-lineside radio communication, with wayside stations 30 miles or so apart, means that every train is within talking distance of a station. The crews of trains running over single-track lines can be informed when opposing trains are delayed and meets have to be rearranged. Train-crews can be informed while in motion as to

special stops needed to pick up wagons and any other unscheduled work that a train may be required to do. A particularly valuable use of radio equipment is when a hot box, dragging equipment, or a shifted load on one moving train is seen by the crew of another or from a wayside radio station, because it is possible to get into immediate touch with the crew of the train affected. The radio also forms a most valuable means of communication in the event of telegraph or telephone wires at the lineside having been brought down by snow or storm.

A further use of radio has been the equipment of motorcars, lorries, and rail patrol cars for use by yardmasters, train masters, superintendents, and road foremen of engines. For instance, in the event of a locomotive breakdown, a road foreman of engines can radio instructions to the engine crew as to how to deal immediately with some engine failure.

The civil engineers are now using wireless extensively. One railway in the Middle West has equipped all its track relaying, ballasting, and sleeper renewal gangs with radio; this makes it possible to give gangs in the open country ample warning of the approach of trains, whereas previously, if the gangs cleared the line in readiness for the train's schedule time, they might waste time waiting for it because it was running late. Where the track equipment is spread over a considerable length of line, also, the foreman finds it easy to keep in touch by radio with all sections of his gang, which helps to expedite the work.

### Marshalling Yards

Walkie-talkie apparatus is of the greatest assistance in marshalling yard work. Clerks engaged in wagon checking can read off the initials, number, and type of every wagon as it passes them at a predetermined point, or as they walk the length of a train, and communicate the information direct to the yard office. Wagon inspectors similarly can keep directly in touch with the yard

office, and, by means of paging speakers in the yard, can carry on a two-way conversation.

Other walkie-talkie uses are in shunting operations during fog, in reading levels and setting stakes by survey parties, in aligning searchlight signals, and in checking switch positions and signal aspects when bringing a new interlocking plant into operation. One railway has even equipped an overhead crane in a freight depot with walkie-talkie radio, to enable the foreman on the depot floor to give precise instructions to the crane driver.

### Interchangeable Units

The production technique with apparatus has now reached the stage in which a single interchangeable "package" unit, incorporating transmitter, receiver and power supply, is now accepted as standard by the Association of American Railroads. This makes it possible to interchange units on locomotives, cabooses, and at lineside stations, provided that they operate on the same voltage. A considerable advance has been possible by the substitution of transistors for radio valves, so greatly reducing the size and weight of the radio units. A complete transmitter receiver-power-supply unit is now being produced at a weight of 25 lb., and transistor walkie-talkie sets weigh no more than 9 lb. With these advantages transistors give longer life, have a lower current consumption, and are, of course, easier to handle than the previous valve sets.

By 1962 "split-channel" radio will have been brought into use by the Federal Communications Commission, and will compel the railways to operate on narrower channels than at present. The radio equipment manufactured during the past two years is capable of split-channel operation, and most earlier sets can be converted for not more than \$10 each. The present indications are that in the United States by 1965, radio communication on railways will have become as commonplace as telephone communication is today.

**HOLIDAY SEASON TICKETS IN EASTERN AND N.E. REGIONS.**—British Railways, Eastern and North Eastern Regions, are to introduce a new type of holiday season ticket, known as the Rail Rover, available for any seven consecutive days between April 1 and October 31 this year. There are two areas in which the ticket will be available. One covers the whole of the North Eastern Region and the other the whole of the North Eastern and Eastern Regions. It will be available for unlimited travel by any ordinary train or advertised excursion train between any stations in the particular area to which it applies. The cost of the North Eastern Region ticket is £7 10s. first

class, or £5 second class and in the case of the combined North Eastern and Eastern Regions ticket, the cost is £13 10s. first class, or £9 second class.

**BRITISH STANDARD FOR DRAWING BOARDS AND TEE SQUARES.**—Because top-grade Honduras pine and yellow mahogany are no longer available in the large quantities required for the commercial production of standard quality drawing boards and tee squares, the manufacturers of these items have requested a revision of B.S. 1265/68: 1945. This has now been made and allows an increased range of timbers whose suitability has been proven by experience

gained during recent years. Each standard in the new publication, which is of 19 pp. and illustrated, specifies the sizes, materials and constructional details of the appropriate product. There is a specified moisture content for the wood used for the drawing boards and the ebony-edged tee squares; and a detailed method for its determination is given in an appendix. The four standards each cover engineers' pattern and students' drawing boards and tee squares. Copies of the publication B.S. 1265/68:1958 may be obtained from the British Standards Institution, Sales Branch, 2, Park Street, London, W.1. The price is 5s.

## RAILWAY NEWS SECTION

## PERSONAL

Mr. W. E. Knox, Director, Administration Division, Export Credits Guarantee Department, has retired. He has been succeeded by Mr. F. H. Whittaker, formerly in the Industries & Manufactures Department of the Board of Trade.

Mr. M. M. Greve, M.Inst.T. who, as recorded in our February 7 issue, has

and in that grade successively became responsible for the following: Running Sheds, Carriage & Wagon, Operating, Commercial and Administrative. In 1949 he was promoted to be Divisional Transportation Superintendent. Mr. Greve represented the Ceylon Government Railway at the XVth Session of the International Railway Congress in London in 1954. On return to Ceylon he attended a refresher course in railway operation at

manding the Light Railway Workshops, Beaurianville, B.E.F., and Carriage & Wagon Depot, Audruicq, B.E.F. He retired from the military service in 1919 with the rank of Lt.-Colonel. In 1925 he was gazetted Lt.-Colonel, Land Forces, and was called up on mobilisation in 1939, but authority was obtained for his retention in the railway service. He was gazetted Major in the Royal Engineers (Engineer & Railway Staff Corps) on February 1, 1944, and



*Mr. M. M. Greve*  
Appointed Operating Superintendent,  
Ceylon Government Railway



*The late Lt.-Colonel Harold Rudgard*  
Chief Officer (Motive Power) to the  
Railway Executive, 1948-50

been appointed Operating Superintendent, Ceylon Government Railway, was born in 1907. He received his training in mechanical engineering as a premium apprentice at Leyland Motors Limited from 1928 to 1931, and as a pupil apprentice in the locomotive workshops of the London Midland & Scottish Railways at Derby from 1931 to 1933. While serving his apprenticeship, Mr. Greve attended lectures at the Harris Institute, Preston, and the Derby Technical College. He obtained the Ordinary and Higher National Certificates in mechanical engineering, and was elected an associate member of the Institution of Automobile Engineers in 1940. He became an associate member of the Institution of Mechanical Engineers in 1943. He was appointed Planning & Progress Foreman in the Ratmalana Workshops of the Ceylon Government Railway in 1936 and then, after a period as Erecting Shop Foreman, became Diesel Trains Foreman. In 1939, he was appointed Assistant Divisional Transportation Superintendent

the United Nations Organisation Regional Training Centre, Walton, Lahore, on a Colombo Plan Scholarship. He was appointed Commercial Superintendent, the position he now relinquishes, in 1955.

We regret to record the death, on March 5, of Lt.-Colonel Harold Rudgard, O.B.E., M.I.Mech.E., M.I.Loco.E., M.Inst.T., former Chief Officer (Motive Power), Railway Executive. Colonel Rudgard entered the service of the Midland Railway in 1900 as a pupil under Mr. S. W. Johnson. After going through the shops, he obtained six months' firing experience before entering the drawing office, and later was appointed successively, District Locomotive Superintendent at Skipton, Derby, and Plaistow (London, Tilbury & Southend Section). He was called up in the Territorial Army in 1914 and served for 20 months in the trenches; later he was attached to the Royal Engineers, Light Railway Section, as Superintendent of Light Railways, 4th Army, afterwards com-

Lt.-Colonel on February 26, 1949. During his service in France and Belgium he was wounded twice, and on two occasions was mentioned in despatches. In 1919 he was appointed Assistant Superintendent of Freight Trains, M.R., Derby, and, on grouping, was made Assistant to the Motive Power Superintendent, L.M.S.R., Derby. In 1932 he became Divisional Superintendent of Motive Power (Midland Division), Derby, and, in 1935, Assistant Divisional Superintendent of Operation at that works. He became Divisional Superintendent of Operation in 1937. In 1938, under Colonel Rudgard's leadership, the Midland Division won the Express Passenger Train competition, which carried with it the Byrom Cup; also the 1938 Divisional Freight Train Competition. He was appointed Superintendent of Motive Power in December, 1942, and Chief Officer (Motive Power), Railway Executive, in 1948. In 1947 he prepared, for the L.M.S.R., a publication entitled "Motive Power Organisation and Practice." Colonel Rudgard was President



**Mr. A. H. Evans**

Appointed Manager of Stores, Montreal,  
Canadian Pacific Railway



**Mr. E. J. Card**

Appointed Supplies Officer of the  
British Transport Commission



**Mr. R. S. Boyd**

Appointed Secretary, Scottish Area Board,  
British Transport Commission

of the Institution of Locomotive Engineers for 1948-49. He retired from railway service in December, 1950. He was Chairman of the Festiniog Railway Society Limited from 1956 until his death. The funeral took place at All Saints Church, Southbourne, on March 10, and was followed by private cremation.

#### AN APPRECIATION

His many friends will, I am sure, feel a great loss with the passing of Harold Rudgard. He was a great character and one who had made a considerable contribution to the development of standard motive power on the former L.M.S.R. Company, where he was Superintendent of Motive Power and afterwards Chief Officer (Motive Power) at the Railway Executive.

He was the embodiment of cheerfulness and had an exceedingly generous nature. Not only did he serve the railways well but gave good service to his country in the 1914-18 war and afterwards.—J. W. W.

Mr. A. H. Evans who, as recorded in our February 7 issue, has been appointed Manager of Stores, Canadian Pacific Railway, joined that system in 1914. After wartime service in the Royal Flying Corps he returned to the C.P.R. and became Munitions Storekeeper at Angus Shops, Montreal, in 1943. A year later he was loaned to the War Assets Corporation. He returned to the C.P.R. in 1946 as Assistant to the General Storekeeper, Montreal, and, the following year, became Assistant to the Manager of Stores. In 1950 he was transferred to Winnipeg as District Storekeeper. Since 1951 he has been General Storekeeper of the Eastern Region of the company, with headquarters at Angus.

Mr. C. Scutt, Assistant to Motive Power Superintendent (Utilisation), Eastern Region, British Railways, has been appointed Motive Power Assistant in the office of the Line Traffic Manager (Great Eastern), Liverpool Street.

Mr. J. W. Lawrenson, Assistant Traffic Manager, West Yorkshire Road Car Co. Ltd., Harrogate, has been appointed Traffic Manager of that company.

Mr. E. J. Card, who, as recorded in our February 7 issue, has been appointed Supplies Officer in the Supplies Department of the British Transport Commission's Central Services, joined the former Great Northern Railway in 1921, in the Stores Superintendent's Department at Doncaster. In 1937 he was transferred to the Chief Stores Superintendent's Department of the L.N.E.R. and, after gaining experience in various sections, was appointed Senior Assistant (Staff & General) in the Purchasing Agent's Office at Kings Cross in 1948. In 1950 he became Head of Section (Purchasing & Sales) in the Chief Stores Officer's Department, Railway Executive. In 1953 he was appointed Assistant (Purchasing & Sales), London Midland Region. In 1956 he was loaned to the Chief Stores Officer's Department of the Commission as Senior Purchasing Assistant.

Mr. L. Holmes, Chief Claims Clerk, Leeds, North Eastern Region, British Railways, who, as recorded in our February 14 issue, has been appointed Assistant (Claims), Chief Traffic Manager's Office, Leeds, began his career with the Great Central Railway at Grimsby Docks in 1921. He gained experience at various stations in Lincolnshire, and became a Railway Representative at Newark in 1945. He moved to the Leeds district in 1947 as Claims Prevention Inspector and, in 1950, was appointed to a position in the Claims Section of the Chief Commercial Manager's Office, York. With the centralisation, in 1956, of the North Eastern Region's claims work, Mr. Holmes was appointed Head of the Goods Claims Section in the Chief Traffic Manager's Office, Leeds, becoming Chief Claims Clerk in the same office in 1957.

Mr. J. C. H. Brash, Electrification Assistant to the Chief Operating Superintendent, Glasgow, Scottish Region, British Railways, has been appointed District Operating Superintendent, Glasgow (North).

Mr. K. F. Mason, Assistant District Goods Manager (Sales), Manchester, London Midland Region, British Railways, has been appointed District Goods Manager, Warrington.

Mr. R. S. Boyd, who, as recorded in our January 7 issue, has been appointed Secretary of the Scottish Area Board of the British Transport Commission, joined the former L.M.S.R. in 1937. After three years in the Commercial Manager's Office, Glasgow, he was transferred to the office of the Chief Officer for Scotland. He served in the R.A.F. from 1942 until 1946 and, before being demobilised, was seconded on flying duties to B.O.A.C. On returning to the office of the Chief Officer for Scotland, he was engaged on statistical work. After nationalisation, he was employed in the New Works Section of the Chief Regional Officer's Office and, in 1953, was transferred to the Commercial Superintendent's Office. In 1954 he returned to the Chief Regional Manager's Office. Since then he has occupied various positions in the Works Section of the General Manager's Office.

Mr. C. J. Cornwall, F.I.A., who, as recorded in our February 28 issue, has been appointed Staff Administration Officer, London Transport Executive, with effect from February 3, 1958, will be responsible to the Chief Establishment Officer. His duties will cover actuarial matters and the Central Record of Staff Statistics for matters relating to pension schemes, friendly societies and passes and permits. He will advise the staff on personal problems and will manage the personal visiting services for the staff. Mr. Cornwall, who is 30, received his early education at Radley College. After service with the Royal Air Force, he entered Trinity College, Cambridge. He is a Fellow of the Institute of Actuaries. He joined the service of the London Transport Executive in 1951 in the department of the Chief Development & Research Officer. He was transferred to the Staff Administration Office in 1953.

Mr. F. C. Margetts, a nominee of the British Transport Commission, has been appointed to be a member of the Transport Users' Consultative Committee for the Yorkshire Area. Mr. Margetts replaces Mr. F. Grundy who has resigned owing to his transfer to other duties with the Commission. Mr. Margetts is the Chief Traffic Manager of the North Eastern Region of British Railways.



Mr. W. T. Fearn

Appointed Stationmaster, Victoria,  
Southern Region



Mr. Charles Evans

Elected President of the  
N.U.R.



Mr. S. F. Green

Elected General Secretary of the  
N.U.R.

Mr. W. T. Fearn, formerly Stationmaster at London Bridge, Southern Region, British Railways, who, as recorded in our November 1 issue, has been appointed Stationmaster at Victoria, began his career as a junior clerk at Gillingham, Kent, in 1914. After service as Station and Relief Clerk he transferred in 1924 to the Divisional Office at Dover. Here he remained until 1930, subsequently moving to the Divisional Office at London Bridge. In 1937 Mr. Fearn became Stationmaster at Teynham. Appointment in a similar capacity followed at Headcorn and Sevenoaks and, in 1946, he became Assistant Stationmaster at London Bridge. Two years later, he was appointed Stationmaster at East Croydon and, in May, 1951, Stationmaster at Brighton. He returned to London Bridge in November, 1953.

We regret to record the death, on March 7, of Mr. George Perrins, Chief Engineer of Bullers Limited.

We regret to record the death at the age of 53, on March 4, of Mr. James D. Laing, Commercial Manager of Yorkshire Copper Works Limited.

Mr. W. P. Holmesby, Chief Designing Engineer, Commonwealth Railways of Australia, is in this country to inspect and pass the wheel-truing machine built for his system by the Atlas Engineering Co. Ltd.

Mr. Charles W. Evans, who, as recorded in our February 28 issue, has been elected President of the National Union of Railwaymen, is 52. He is a checker at Kings Cross Goods Yard, Eastern Region, British Railways, and has been a member of the N.U.R. executive for two years, and a Branch Secretary for 16 years. He has been a member of the Labour Party for 31 years and is a former member of Islington Borough Council. Mr. Evans was awarded the British Empire Medal, in 1946, for services to fellow workers.

Mr. Sidney F. Green, who as recorded in our February 28 issue, has been elected General Secretary of the National Union of Railwaymen, is 47. He began his

career at the age of 14 as a messenger with the Great Western Railway at Paddington Goods Station. Six years later, having studied economics and political history at night classes and by correspondence course, he became Vice-Chairman of the local N.U.R. branch. He was appointed a full-time union organiser in 1944 and, in 1953, became Senior Assistant Secretary of the N.U.R. For seven years Mr. Green served as a Labour Member for Paddington Borough Council.

#### MR. C. K. BIRD

A memorial service to Mr. C. K. Bird, late General Manager of the Eastern Region of British Railways, was held on Friday, March 7, at the Church of St. Botolph, Bishopsgate, E.C.2. The service was conducted by the Rector, Prebendary H. H. Treacher, and the choir was formed by a section of the Eastern Region Musical Society with Mr. A. T. S. Rayner, Regional Welfare Officer, as organist.

In addition to family mourners, the service was attended by the Chairman of the British Transport Commission, Sir Brian Robertson, and Lady Robertson; the Deputy-Chairman, Sir John Benstead; the Chairman, Deputy-Chairman, and Secretary of the London Transport Executive, Sir John Elliot, Mr. A. H. Grainger, and Mr. R. M. Robbins; the Chairman of the Eastern Area Board, Sir Reginald Wilson, and the General Manager of the Eastern Region, Mr. H. C. Johnson, who read the lesson. Also present were Messrs. J. K. Abson, Cecil J. Allen, W. P. Allen, H. C. Amis, E. W. Arkle, P. C. W. Bain, T. H. Baker (also representing Mr. F. G. Hole).

Messrs. J. W. Bannard, W. S. Barnes, J. W. Barnett, Sir Michael Barrington-Ward, Messrs. E. Bath, Dr. J. Binning, Messrs. J. Blundell, M. R. Bonavia, R. C. Bond, J. Booth, Sir Archibald J. Boyd, Messrs. J. H. Brebner, B. H. Briston, W. Brown, M. A. Cameron, J. Bonham-Carter, G. W. Chandler, H. A. Chapman, J. W. Christopher, G. Coaker, E. Coleby, C. H. Cowtan, F. G. Crabb, A. L. Crewe, Norman Crump, W. S. Cutler.

Messrs. C. Dandridge, J. R. Dallmeyer, J. W. Davies, A. G. Dawson, J. W. Dedman, George Dow, A. R. Dunbar,

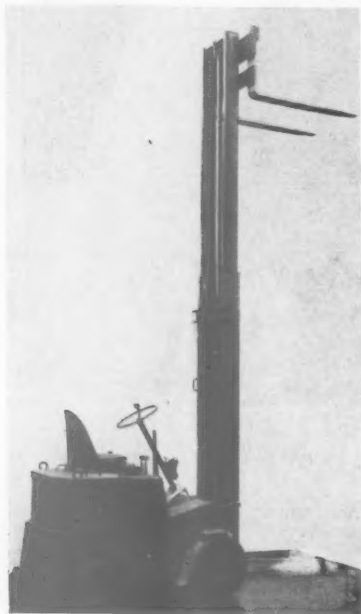
J. W. Dunger, C. W. Evans, A. R. Ewer, E. R. Farr, D. Fenton, H. W. Few, G. F. Fiennes, J. O. M. Fisher, J. S. Gavin, F. A. Gilberthorpe (also representing Mr. E. K. Portman-Dixon), W. Goldfinch, H. R. Gomersall, F. Goodricke, F. W. Goring, W. F. Gorst (also representing Mr. B. W. C. Cooke).

Dr. J. Sharp Grant, Messrs. R. A. Green, S. F. Greene, J. W. Grieve (also representing Mr. K. J. Cook), Messrs. H. H. Halliday, N. Hamilton, A. E. Hammett, J. R. Hammond (also representing Mr. R. F. Hanks, Mr. K. W. C. Grand and Mr. H. G. Bowles), Messrs. J. Hancock, A. A. Harrison, T. R. Hawkes, S. G. Hearn, T. M. Herbert, J. Hippisley, T. H. Hollingsworth, G. F. Huskisson, W. L. Ives (also representing Sir Reginald Kerr), Messrs. R. James, N. McK. Jesper, B. X. Jessop, A. J. Johnson, C. Keep, H. G. B. Kelley, S. Kennedy, C. W. King, C. F. Klapper, A. O. Ladell, Brigadier C. A. Langley, E. J. Larkin, R. J. Ledoch, Sir Robert Letch, Messrs. C. N. Lidguard, R. A. Long, T. J. Lynch.

Dr. A. C. Mackay, Messrs. W. Mackenzie, A. B. MacLeod, D. McKenna (also representing Mr. C. P. Hopkins), C. S. McLeod, A. E. Marriott, L. B. Marson, T. C. B. Miller, C. N. Montague, A. Moss, D. Murray, A. H. Neale, J. Ness, R. W. Newland, T. V. Nicholson, M. Pearson, J. B. Peile (also representing Sir Ronald Matthews), Messrs. G. E. Graves Peirce, R. R. Pattit, C. H. S. Pickett, W. J. Porter, H. H. Powell, S. Pyle, F. Rayns, J. Ratter, C. G. Reddington, J. E. M. Roberts, V. A. M. Robertson, E. W. Rostern, R. E. Sadler.

Messrs. L. M. Sayers, R. Byron-Scott, R. W. Scott (also representing Mr. L. E. Marr), H. A. Short, O. R. Smart, S. W. Smith, W. A. G. Suddaby, A. W. Tait, J. Tavener, G. Taylor, L. A. A. Taylor, R. B. Temple, A. K. Terris, M. B. Thomas, J. Taylor Thompson, R. Thompson, W. G. Thorpe, C. B. Tidmarsh, A. F. Tompsett, Sir Landale Train, Messrs. E. D. Trask, G. W. H. Trotman, A. B. B. Valentine, E. J. Vipond, W. J. Vincent, A. F. Wallis, L. L. Wansbrough-Jones, J. W. Watkins, J. L. Webster, Sir Cecil Weir, Messrs. J. F. Wheatley, A. J. White, C. E. Whitworth, D. B. Wilkinson, E. Willcock, E. R. Woollatt.

## NEW EQUIPMENT AND PROCESSES



### Battery-Powered Fork Lift Truck

**A** BATTERY-POWERED fork lift truck, the NR 20, has recently been developed from the manufacturer's FL 2000. It has the same capacity, that is 2,000 lb. at 24 in. centres, but the performance is stated to be considerably improved by the reduced turning circle. There is a reduction in weight, size, and initial cost. The four-wheel design is retained because tests have shown clearly that this results in the maximum possible stability.

The standard freelif of the NR 20 is 4 in. and the lift can vary as required from 96 in. to 168 in. All controls are simple and near at hand. Both foot and hand brakes are provided, incorporating internal-expanding brake shoes. Steering is through a totally enclosed Marles oil bath steering box operating on the rear wheels.

Both pump and driving motors of the manufacturer's design are rated to withstand the overload capacity necessary for arduous duty. The standard model has a top laden speed of 5.5 m.p.h.; it can be supplied on request with a 4 m.p.h. maximum speed; this reduction can be of

particular value where the truck has short distances to travel, by reducing running costs.

Amongst attachments available are an overhead guard for the operator, load backrest, load clamp, rotary forks, fork extensions, crane attachment, a swarf handling hopper, bin attachment, load stabiliser, rotating paper roll clamp, and a side shift to facilitate close manoeuvring. A feature of the truck is a check valve to prevent the too rapid descent of heavy breakable loads; this device still allows the forks to fall rapidly when unladen, however.

The NR 20 is manufactured by Ransomes, Sims & Jefferies Limited, Orwell Works, Ipswich, Suffolk, from which company further particulars may be obtained.

### Industrial X-Ray Equipment

**THE** Type TF 1597 industrial X-ray equipment, recently introduced, can handle a wide range of materials, including steel up to 1 in. in thickness; railway applications appear to include, for example, the inspection of welds in boilers and other fabricated items.

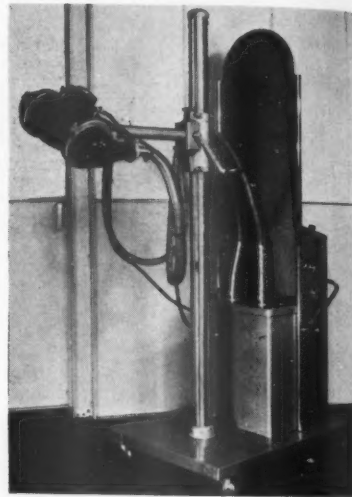
The equipment is a 110-kVp. apparatus, designed for 200-250 V. a.c. operation. It consists of three basic units, h.t. generator, control unit and tubehead. The method of mounting these units depends upon individual requirements to meet any particular inspection problem; each basic unit is portable.

The generator is oil-immersed in a welded-steel tank. It comprises the h.t. transformer and an X-ray tube filament transformer. Two 62.5-kVp. cable sockets provide the output to the X-ray tube, while the input from the control unit is taken to terminals at one end of the tank.

When supplied as a portable unit, it is fitted with a pair of carrying handles, placed so that the control unit can be rested across the top of the tank when in use, or for storage.

The control unit is housed in a rectangular case with a sloping panel on which are mounted all controls and meters. A stout leather carrying handle facilitates portability. The hinged top and front panel of the unit may be swung down to gain access to the components and also to the fuses.

The X-ray insert tube normally supplied can be operated up to 110 kVp., 10 mA., and provision is made for water cooling at the higher ratings. Standard tubehead mountings at present available include a static tubestand, fitted with four telescopic legs and providing facilities for angulating



the tubehead about its short axis; a vertical column tubestand, mounted on a castored base, which is large enough to contain the h.t. generator and the control unit; and a fluoroscopic cabinet, which houses the complete equipment and has a control panel built in.

The Type TF 1597 equipment is manufactured by Marconi Instruments Limited, St. Albans, Herts., from whom further details may be obtained.

### Infra-Red Heaters

**INDUSTRIAL** infra-red heaters of 2½-kW. and 4-kW. loadings have now been developed.

Field experience has shown that in many industrial premises the usual loading of 3 kW. is not quite sufficient to give sufficient downward throw of heat and it is for this reason that the manufacturer has departed from the usual loading ratio for its 4-kW. model.

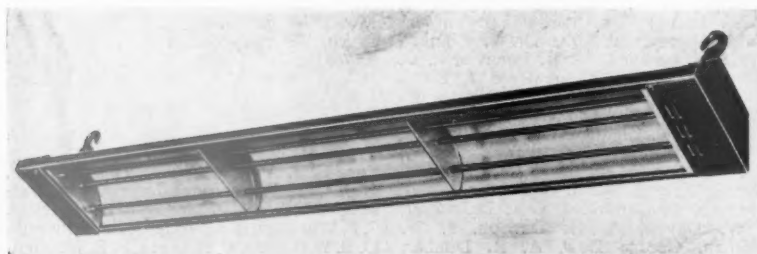
The recommended mounting height of these heaters should be 11-13 ft. and they will give a beam spread of 20-28 ft. The heaters are designed to stand up to heavy duty. Suitable for single- or three-phase supply; they are designed to throw a 90 deg. flood beam.

They are made of pressed steel and incorporate three industrial Inconel elements. The elements are anchored in such a way as will preclude the possibility of element fatigue. The exterior finish of the body is silver grey silicone heat-resisting stove enamel, and the reflectors are of anodised aluminium.

Mounting of the units is by conduit or chain suspension or by direct fixing to the wall with the use of appropriate conduit fittings. Apart from space heating requirements, the heaters can also be used for industrial drying processes.

The IRI.25 2½-kW. model is 30 in. long, has a height of 2½ in., and a width of 6½ in. Model IRI.40, 4 kW., is 48 in. long, and same height and width dimensions.

The price of the IRI.25 is £9 10s.; the IRI.40 is £13 10s. Further details may be obtained from the manufacturer, Dimplex Limited, Millbrook, Southampton.



## Institution of Locomotive Engineers' Annual Luncheon

*Mr. Harold Watkinson on the necessity for British Railways to improve their services: presentation of Institution Bronze Medal to Mr. J. F. B. Vidal*

The annual luncheon of the Institution of Locomotive Engineers was held at the Dorchester Hotel, London, on March 7. Mr. E. S. Cox, President of the Institution, was in the chair, and Mr. Harold Watkinson, Minister of Transport & Civil Aviation, was the principal guest. Some 630 members and their guests were present.

Mr. Watkinson, proposing the toast of the Institution, referred to what he had said when he was present at the annual luncheon two years previously. Then he described what he termed the modernisation plan as the "new deal," which he hoped would transform the railway industry and fit it to play its full part in the new technological age. Two years later, there was already much evidence that modernisation had begun; probably the most readily apparent of the many changes taking place were those associated with traction methods.

By the end of 1957 over 1,000 diesel multiple-unit vehicles had been brought into service, mostly in suburban, rural or cross country lines. Others had appeared in the inter-city services. These were already proving very popular and have brought significant increases in traffic. Light-weight diesels in the London Midland Region, for example, were carrying over 1½ million passengers a month last year, an increase of about 40 per cent over 1956.

Unfortunately, Mr. Watkinson added, they could not yet claim that net receipts had increased in proportion to the traffic. The results were, however, an indication that the public was receptive to good service and that it could be drawn back to the railways when the railways could give the modern service which matched other forms of transport.

With the new programme of main line diesels now being delivered and the new electrification schemes which were going well, progress promised well for the future on the passenger side. The plans for the Kent Coast electrification and for the Eastern Region were well up to schedule; the London Midland Region had succeeded in getting well ahead of schedule and would very soon be starting test runs on a section of its main-line scheme.

### Manning Agreement

Two years ago, he went on, he had referred to the importance of matching the programme for the modernisation of equipment with a programme for the modernisation of the mind. It was no good spending millions on up-to-date equipment unless the men and women concerned were prepared to overhaul their methods and modernise them in a way which would get the best out of the new equipment. For this reason he looked at the recent diesel manning agreement between the B.T.C. and the unions as a most heartening step forward. It showed clearly that the new spirit of co-operation in the introduction of new and almost revolutionary practices for which he hoped, had been achieved—a spirit which he believed could secure the future prosperity of the railways. The agreement reflects the greatest credit on all concerned, particularly the leaders of the trade unions, to whom he knew it presented great difficulties. In an industry which needed so much more modernisa-

tion and which still faced such enormous deficits, which had to be recouped by the nation until modernisation "paid off," this joint approach by management and men to the future was the only one which could restore the profession of railwaymen to the position it once enjoyed.

Mr. Watkinson said that the finest tribute that he had heard to the modernisation programme was from a top link driver. Asked what he thought of the job of driving a modern diesel locomotive, he commented, "I think I was born too ruddy soon." Most people determined to see this great task through would now see the coming of better equipment and better human relations that justified that comment. He could report real progress on this vital point of good teamwork, to which he knew that Sir Brian Robertson, Chairman of the Commission, attached such importance.

### Poor Freight Traffic

There was another side of the picture, he pointed out, which was more disturbing. The present trend of freight train tonnage, particularly in merchandise and livestock, was pointing too much downward for comfort. There were other factors at work besides competition, but whatever the reason, the railways could not afford a downward trend in freight. It called for an all-out drive both to improve the service, and to sell it.

### Warning as to Modernisation

Unless the financial situation of British Railways materially improved, the Minister stated, it would be hard for him to justify, to the Government, further investment in modernisation.

They knew what the railways were doing and planned to do: better traction, continuous brakes to freight wagons, less marshalling. All this added up to greater speed in transit, greater reliability and greater operating efficiency and economy. This catered for siding traffic, more than half the railways' freight.

The other customers, light industry and the general consumer, presented a handling problem as well. They were interested in service from door-to-door and its cost. The aim must be to cut to the absolute minimum the amount of transshipment and sorting which had to take place. Palletisation could help; even more could special containers. He was specially interested to note the introduction of box containers to suit the smaller consignors.

He hoped for more development of these methods, and of roll-on/roll-off methods also. He knew the loading gauge of British Railways presented special problems here, but much effort had been put in elsewhere into development of this sort, like the piggy-back and the two-tier car transporter. These services met a very real need, and could be very competitive.

He had no doubt, he declared, that the railways could solve the problems involved, given time. But time was precious. The future of the railways was being decided over the next few years and they could not wait too long.

In the sphere of freight transport the railways and their suppliers now faced their greatest challenge. If necessary, they should use their national gift for inspired improvisation but they must succeed

and succeed quickly in solving the problem of freight handling that would enable the railways to capitalise fully their new fast freight services.

### Charges, and Commercial Organisation

They would be helped in selling new and better services by release from the rigidity of the old charges scheme. With the new Merchandise Charges Scheme the railways would now be able to quote on more equal terms with other transport.

They would be helped, too, Mr. Watkinson continued, by improved organisation. There would be greater co-ordination between the divisions most closely concerned with the service to the customers: the motive power, the operating, and the commercial departments. They would see more decentralisation from Regional headquarters to line or district, giving the customer a rapid and authoritative contact on the spot.

### Road Competition

He did not under-estimate the threat to the railways in the freight field from the growth of road competition. During 1957 the number of "C"-licences issued exceeded 1,000,000 for the first time. He did not believe that the answer to the railways' problem lay in the control of the "C"-licence operator. Such transport had become part of industrial organisation; and to try to regulate the supply would be to place a tax on industrial productivity which the country could ill afford.

Everything this Government had done in the transport field had one ultimate object only: cheaper and more efficient transport. The right answer to this problem was not to restrict the "C"-licence vehicle and so increase the costs of industry, but to re-vitalise the railways so that the traffics best suited to the railways could be carried more cheaply and more efficiently, on a competitive basis. At the same time he hoped that the managers of firms, before deciding to increase their own "C"-licence fleet, would make quite sure that what they were doing was in their own long-term interests. Managers sometimes might be apt to jump to conclusions instead of making certain that the public haulier, whether road or rail, could not give the service more economically.

The railways would attract a very large share of present "C"-licence traffic as soon as they had developed the kind of freight service which the full development of modernisation would bring.

Perhaps in what he had said, Mr. Watkinson concluded, he had not talked very much about locomotive engineering; but he had said a good deal about locomotion, a word of good classical origin, which freely rendered meant "going places." The railways could and must "go places." It was their important and urgent task to see that they did so. He was sure that the Institution would not fail in its part of this task.

Mr. Cox, responding, thanked Mr. Watkinson for his presence, and spoke of the adaptability of the Institution and its members in turning to diesel and electric traction. The Institution also showed how great was the interdependence between railways and industry. The papers presented to it described

world-wide trends of locomotives and rolling stock engineering.

#### Presentation to Mr. J. F. B. Vidal

The Bronze Medal of the Institution was then presented by Mr. Cox to Mr. J. F. B. Vidal, the previous President, for his outstanding services to the Institution.

Mr. Vidal, in thanking Mr. Cox, spoke of the strong encouragement and assistance which he had received from every member over his term of office.

Mr. S. B. Warder, Vice-President of the Institution, in proposing the toast of the guests, said how pleased they were to welcome so many Members and senior officers of the B.T.C. Amongst the many distinguished guests present was Sir Reginald Wilson, Member of the Commission and President of the Institute of Transport, who had on previous occasions spoken of himself as a "transport man." Mr. Warder pointed out that all those present were "transport men" in one way or another.

Sir Reginald Wilson in his reply spoke of the opportunities ahead of the Institution and its members in assisting the development and construction of new forms of locomotive and rolling stock.

Finally, Mr. Cox introduced Mr. R. A. Arbuthnott, a Director of the North British Locomotive Co. Ltd., as the next President of the Institution.

Among those present were:—

Messrs. E. A. Adams, W. M. Adey, W. A. Agnew, J. F. Alcock, L. B. Alexander, E. L. Allen, R. M. Allen, W. F. Allen, C. G. Anderson, I. L. Anderson, B. W. Anwell, H. J. Arbuthnott, R. Arbuthnott, J. Clubley Armstrong, R. I. D. Arthurthur, W. J. Ash, G. A. Ashton, L. V. Athron, C. R. Atkins, Lt.-Colonel C. R. Atkins, Messrs. R. M. Atkinson, V. Atkinson, C. S. Austen, A. D. Azhar,

Messrs. H. Badger, B. Baker, J. Baker, S. E. Baker, C. Balakrishnan, D. Ball, E. B. Banks, S. Barber, H. P. Barker, D. A. Barnden, R. Barr, G. M. Barrett, D. S. M. Barrie, T. W. Barrow, H. H. C. Barton, L. C. Base, A. E. Bates, H. Bayley, J. E. Beckett, J. Beechy, H. Bennett, J. P. Bennett,

Sir John Benstead, Messrs. G. F. E. Best, N. Bestbier, G. S. Bingham, G. Bird, C. I. Birkbeck, R. W. Black, C. N. Blakeney, A. B. Boath, G. H. E. Bond,

Messrs. R. C. Bond, S. C. Bond, G. Bone, Brigadier A. G. Bonn, Messrs. J. Bowers, H. G. Bowles, Sir Archibald J. Boyd, Lt.-Colonel R. T. Brain, Messrs. A. S. Bramworth, J. K. Bridcut, K. W. Bridges, W. B. Broadbent, K. P. Brockway, A. Kendall Brooke, J. A. Broughall, A. J. S. Brown, E. R. Brown, H. Brown, T. W. Brown, A. W. Browne, Messrs. J. G. Bruce, P. J. Buchanan, R. Bugler, C. J. Bullard, O. V. S. Bulleid, Colonel Bullen, Messrs. J. Burnham, M. G. Burrows, T. K. Burrows, H. L. Butler, R. Butler,

Messrs. A. Campbell, W. M. Cann, J. H. Cansdale, K. Cantlie, E. Card, D. R. Carling, G. W. Carpenter, H. Desmond Carter, H. R. Carver, J. F. Casson, E. Y. Caswell, J. Cave, W. W. A. C. Chalmers, H. T. Chapman, T. R. Charlesworth, R. J. B. Chatterton, H. Cheetham, A. H. Chilton, T. E. Chrimmes, E. F. Clark, Colonel H. E. Clark, Messrs. D. H. Clarkson, E. Claxton, W. W. W. Clayton, A. S. Clegg, H. Clements, S. E. Clotworthy, C. M. Cock, C. S. Cocks, G. Cocks, G. Collingwood,

Messrs. A. F. Collins, C. E. Collins, W. B. G. Collis, J. N. Compton, C. G. Conway, A. E. Cook, K. J. Cook, B. W. C. Cooke, R. C. Coombs, D. F. Cooper, J. Cooper, R. S. Cooper, S. E. Coppen, G. J. Corson, G. C. Courtney, H. Cowan-Douglas,

Messrs. E. S. Cox, J. Craig, W. D. Craig,

M. A. Crane, W. A. L. Creighton, W. N. Crimp, C. R. H. Crosland, R. C. Crouch, T. A. Crowe, N. Crump, R. Curl, J. H. Curry, G. R. Curry, W. E. Curtis,

Messrs. A. C. C. Damant, H. M. Dannatt, E. O. Daum, A. S. Davidson, H. Davies, G. V. Davy, A. L. B. Dawson, D. Dawson, A. E. C. Dent, J. Dent, F. Dickson, W. H. Dixon, G. C. Dobson, R. H. Dobson, R. E. Dore, Dr. L. Douglas, Messrs. A. Dowie, G. H. Dowsett, P. H. S. Drew, J. P. A. Drewry, R. J. Drury, J. W. Duggan, A. R. Dunbar, A. G. Dunn, C. H. Dunt,

Messrs. H. J. Ebner, J. W. Eling-Smith, Sir John Elliot, Messrs. F. Ellis, R. Ellis, P. Emmerton, J. A. Esplin, E. M. Eustace,

Messrs. C. Fawcett, S. E. Fay, W. Featherstone, Lt.-Colonel L. F. R. Fell, Messrs. A. D. Ferguson, J. W. Ferguson, A. L. Fielding, J. J. Finlayson, R. E. Fordham, B. G. V. Forman, I. C. Forsyth, S. C. H. Fossett, H. C. Foster, A. E. Frost, H. W. Fulton, W. J. Fulwell,

Messrs. E. P. Gabriel, W. Galloway, M. A. Gardiner-Hill, J. B. Gascoyne, H. F. S. Gedge, W. T. Gedge, A. Gibson, C. R. Gibson, G. Gibson, J. L. Gilbert, Dr. T. Scott Glover, Messrs. G. Godfrey, G. C. Gold, H. R. Gomersall, C. L. Gormley, T. E. Gould, T. W. Gould, D. L. Gourlay,

Messrs. A. H. Grainger, K. W. C. Grand, P. Gray, E. W. Greaves, H. Green, T. E. Green, A. H. Greenham, T. Greenwood, Lt.-Colonel H. Gresham, Messrs. R. Gresley, J. W. Grieve, W. Griffiths, J. R. Grimsdell, J. P. A. Grose, G. Grubb, R. G. Guest,

Messrs. J. Hadfield, T. O. M. Halliday, J. Hamilton, J. R. Hammond, R. F. Hanks, J. Hannah, E. W. Hanslip, H. S. Hanson, F. D. M. Harding, L. W. Harding, R. J. Harding, N. Hargreaves, J. F. Harrison,

Messrs. G. T. Hart, R. F. Harvey, Randal J. Harvey, C. A. F. Hastilow, M. S. Hatchell, A. P. Hatz, J. H. P. Hawtreay, C. H. Heavey, R. J. P. Heck, A. B. Henderson, N. B. Henderson, R. Henderson-Tate, M. A. Henstock, M. F. Hesse-Phillips,

Messrs. J. L. Hewitt, F. A. Hewson, W. E. Hicks, G. R. Higgs, A. Hill, J. Hill, T. A. Hill, A. J. Hirst, E. K. Hoar, A. E. Hoare, R. G. Hodges, R. B. Hoff, R. J. Hogben, S. Hogg, H. Holcroft, A. Hood, F. E. Hough, F. A. Howard, J. B. S. Howard, R. Howard, T. G. Howard, E. P. Hubbard, J. T. Hudson, A. Huffinley, D. Hughes, T. R. M. Hume, K. A. Hurve, C. G. H. Hyslop,

Messrs. B. G. Illingworth, F. B. Illston, C. C. Inglis, J. W. Innes, R. K. Innes, H. G. Ivatt, K. T. Ivy,

Messrs. G. C. Jackson, F. H. Jaekel, P. G. James, E. Jarman, J. M. Jarvis, A. E. Jeffery, A. Johnson, H. C. Johnson, J. D. Johnson, N. Johnson, J. J. Johnston, R. Johnston, E. L. Jones, J. S. Jones, W. L. Jones, S. Jones-Frank,

Messrs. K. E. Karlsson, S. P. Kay, J. V. Keene, W. G. Kefford, W. Kelway-Bamber, M. W. Kendall, E. Kent, E. H. Ker, J. W. G. Kershaw, J. A. Keyden, G. G. Kibblewhite, N. G. Kilshaw, A. S. King, Sir Arthur Kirby, Messrs. L. Kitson, C. F. Klapper, R. P. Knight, J. P. Koster, G. Krishnaswamy,

Messrs. T. T. Lambe, A. Lamm, E. A. Langridge, T. S. Lascelles, G. F. Laurence, H. J. Lawes, E. Lawton, L. Lawton, L. Ledger, Colonel Sir William Leggett, Messrs. F. Lemass, M. H. P. A. Levie, O. M. Lewin, W. D. Light-hall, J. H. P. Lloyd, S. N. Loosen, F. Lord, J. K. Lord, S. E. Lord, W. D. Lorimer, R. C. S. Low, E. P. Lumley, S. C. Lyon,

Messrs. W. H. W. Maass, C. Macdonald, W. F. Mackie, A. B. Macleod, L. T. Madhani, C. U. Magnusson, J. Pelham Maitland, N. W. Manby, A. W. Manser, R. E. Marks, W. E. Marrian, R. F. Marriott, G. C. Marsh, S. G. Marsh, A. N. Marshall, K. C. T. Marshall, K. K. Marshall,

Messrs. V. M. Marshall, E. W. Marten,

F. G. S. Martin, F. Mason, W. McCraith, G. McGuigan, D. McKenna, W. McKie, E. J. Meadows, H. Melhuish, L. Melhuish, T. Mensforth, E. A. Merryweather,

Messrs. B. L. Metcalf, J. P. Metcalfe, R. Metcalfe, H. Mueller, P. Middlemas, T. C. B. Miller, W. J. Mitchellhill, E. S. Moore, F. H. Morfey, E. J. Morris, I. T. Morrow, W. H. Morton, C. Muirhead, J. R. Muncaster, F. T. Muncey, J. B. L. Munro, A. F. Murphy, R. L. Murray,

Messrs. O. Naylor, G. H. Negus, Sir George Nelson, Messrs. H. H. J. S. Nelson, R. E. Nelson, S. Newman, H. Newsam, N. Newsome, W. F. Noble, O. S. Nock, G. E. Norris, Sayed Mohamed Ali Nour, Mr. S. Nyblin,

Messrs. T. H. Odwell, P. Oldham, J. H. Onions, E. N. Osborne, E. C. Ottaway, G. T. Owen, J. E. Owston,

Messrs. A. H. C. Page, P. S. Palmer, C. R. Parker, G. W. Parkin, A. J. Parsons, G. R. Partridge, C. R. Pasley, G. Passey, C. Peebles, C. H. N. Pierce, G. Pettigrew-Smith, W. Pickett, A. H. Pickworth, V. W. Pilkington, H. T. Pilot, A. W. Pitman, K. H. Platt, D. C. Plyer, W. F. Pope, S. Potter, T. Potter, R. A. Powell, C. H. Poynder, F. J. Pratt, R. H. Price, A. W. Puls,

Messrs. B. B. Rackstraw, H. W. Ralph, J. Ratter, N. Reast, W. E. A. Redfearn, M. W. T. Rees, A. Reidinger, N. R. Reynolds, W. Rhodes, G. M. Rial, R. T. Ribbons, R. A. Riddles, J. L. Riordan, S. C. Robbins,

Messrs. C. T. Roberts, L. T. Roberts, R. C. Roberts, A. S. Robertson, D. J. C. Robertson, E. A. Robinson, M. D. Robinson, W. A. Robotham, A. E. Robson, G. W. Robson, C. F. Rose, F. B. Rose, J. Rostron, Lord Rusholme, Messrs. W. J. Ruston, C. F. Ryan, Messrs. J. E. Sandham, S. H. Saunders, G. Savill, M. G. Sawyer, D. P. Sayers, L. M. Sayers, N. Schofield, S. Schofield, T. Schur, J. S. Scott, P. C. Searle, Sir George K. Seal, Messrs. E. W. Selby, C. A. Shepherd, H. N. Shepherd, F. E. Sheppard, J. A. Shingleton, J. F. Shipley, F. Shore, C. J. Shuttleworth, L. Sibbitt, E. M. Simmonds, A. W. Simmonds, G. S. Simmons, J. A. Simms, C. R. H. Simpson, E. S. Simpson, T. F. B. Simpson,

Messrs. J. O. Sims, F. W. Sinclair, W. O. Skeat, E. J. Skinner, R. A. Smeddle, C. Leslie Smith, F. C. E. Smith, G. Smith, I. K. Smith, J. W. Smith, W. Gilmour Smith, G. T. Smithyman, W. A. Smyth, H. S. Smythe, A. H. Sommer, A. K. Southern, J. C. Spark, H. Sparrow, B. Spencer, J. C. Spencer, F. L. Stafford, A. G. Standbridge, Sir William A. Stanier, Messrs. E. Stanley, G. Statin, C. A. Stead, R. R. Stephens, T. H. Stephenson, W. Stewart, D. S. Stockings, H. J. Stretton, H. S. Stubbs, L. J. Styles, A. Suess, J. Swanborough, A. Sykes, W. J. A. Sykes, Major-Gen. G. S. Szlumper,

Messrs. C. J. Taft, P. N. Tarleton, V. Tarnowiecki, A. T. H. Taylor, A. W. F. Taylerson, Major E. W. Taylerson, Messrs. A. G. Taylor, A. J. Taylor, G. H. Taylor, K. Taylor, L. D. Taylor, R. J. Taylor, G. Tew, F. Theakston, M. J. Theakston, D. R. Thomas, G. Thomas, R. Thompson, T. B. Thompson, W. T. Thompson, Group Captain P. G. Thompson, Messrs. T. Thomson, P. W. J. Thornhill, J. Thorpe, Major E. B. Todd, Mr. W. L. Topham, Sir J. Landale Train, Messrs. C. L. Trask, E. D. Trask, J. S. Tritton, T. L. J. Tritton, A. W. Trow, R. Tuddenham, R. M. Tufnell, F. Turner, J. Turner, W. Vandy, Lt.-Colonel C. E. Vaughan, Mr. J. F. B. Vidal,

Messrs. C. C. Waddington, C. C. H. Wade, F. Wakefield, W. J. Wakley, J. C. Walford, G. Walker, S. Walker, A. L. Wallace, A. F. Walters, J. R. Walton, Major-General L. Wansbrough-Jones, Messrs. S. B. Warder, J. W. Watkins, Harold A. Watkinson, F. J. R. Watts, J. C. Way, W. H. Webb, R. E. G. Weddell, Sir Cecil Weir, Messrs. E. D. Wells, G. M. Wells, H. C. W. Westwood, J. E. Whatmough, E. L. E. Wheatcroft, F. M. G. Wheeler,

S. F. Wheeler, H. A. A. White, E. N. White, Messrs. E. T. White, H. B. White, H. E. A. White, S. White, W. H. White, F. Whyman, R. S. Wild, A. V. Wilkin, P. A. Willeard, A. Williams, G. Williams, W. Cyril Williams, E. J. Wilson, G. A. Wilson, Lt.-Colonel G. R. S. Wilson, Sir Reginald H. Wilson, Messrs. W. H. Wilson, A. J. L. Winchester, G. F. Wix, H. Wolstenholme, F. H. Wood, J. A. Wood, D. G. Woodman, C. Wordsworth, W. Worth, M. G. Young, B. Zavatarelli.

### Western Region Three-Car Cross-Country Diesel Sets

Three-car multiple-unit trains were introduced in the Western Region on March 10. Built at the Western Region Swindon Works, they accommodate 18 first and 148 second class passengers.

The leading and rear vehicles are motor coaches. The centre vehicle contains a small buffet, with collapsible tables adjacent to each passenger seat.

Plastic panelling above and at the sides of the buffet counter is in medium Australian walnut design. The buffet is equipped with a hot water boiler which operates on propane gas carried on the underframe. An electric refrigerator, sink, storage cupboards, display case and shelves are provided; all shelves are finished with light coloured plastic. An electric extractor fan is fitted in the roof of the buffet.

The power cars are each fitted with two 150-h.p. horizontal type six-cylinder "A" type engines, supplied with the necessary control and transmission equipment by British United Traction. These items are all standard with other B.U.T. equipment supplied to British Railways.

#### Services Worked

The trains replace steam trains between Cardiff and Bristol and between Birmingham and South Wales stations on the 8.5 a.m. Cardiff to Bristol, 10.22 a.m. Bristol to Cardiff, 4.47 and 8.15 p.m. Cardiff to Birmingham, and 5.40 p.m. Birmingham Snow Hill to Cardiff.

In addition, they are to replace existing inter-city diesel sets on the 12.10 and 8.15 p.m. Cardiff to Birmingham, and 12.25 and 8.30 p.m. Birmingham to Cardiff.



Interior of the prefabricated prototype goods office at North Walsham

### Construction of Small Buildings in the Eastern Region

To speed up the erection of small buildings, a new system of prefabricated construction is being introduced by the Eastern Region of British Railways, using timber as the principal material.

The system is based on a 3 ft. 3 in. planning grid, allowing 3 ft. for infilling and 3 in. for the structural space. The wall frames, which are made of hardwood, have been designed to be fitted with a variety of external and internal cladding materials.

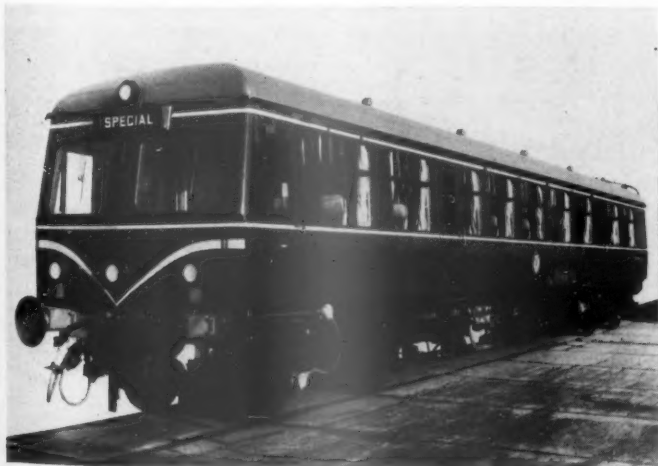
The roof is supported by double laminated softwood beams at 3 ft. 3 in. centres, and the partitions consist of studded softwood frames which can be simply connected to form two, three, or four-way junctions as required.

Early in the design stage a cost analysis was made of 10 recent buildings of more conventional construction. A cost plan for the new system was based on the average of these, to ensure that the new

type of building would be no more expensive. Apart from site slabs and services, all the building components are of dry construction so that the erection of the superstructure is rapid and progress is not affected by weather conditions.

The system was designed by the Architect of the Eastern Region, under the general direction of Mr. A. K. Terris, Chief Civil Engineer. The quantity surveyors for the cost analysis were Messrs. Yeoman & Edwards.

The first building to be completed using the new system was recently opened at North Walsham main station. It is a small office building for clerical and checking staff dealing with goods traffic. The wall frames in this instance are made of kapur, a Malayan hardwood, with dark green insulated vitreous enamel panels externally, and plasterboard internal lining. Externally, the hardwood is treated with transparent lacquer and the fascia is painted white. The main contractor for the erection was J. Youngs & Son Ltd., of Norwich.



Motor second class coach of three-car "cross country" diesel-mechanical set, Western Region; the coaches are vestibuled together



Interior of second-class trailer; this vehicle incorporates a small buffet

## New Stations for Electrified Lines in the L.M. Region

To keep pace with main line electrification work, a new kind of prefabricated station building has been developed by the London Midland Region of British Railways.

The buildings are made from standardised components of steel, aluminium, wood, plastic and special compositions, produced in factories and assembled by numbers on site. The components can be adapted to varying shapes of building, and the system is particularly suitable for use in difficult site conditions.

### Change of Level

To provide for high-speed running planned with electrification, tracks have to be raised on a deeper bed of ballast. This means that many platforms and station buildings are then at the wrong level. In some cases existing buildings were also found to be old and unsuited to the new operating requirements and complete reconstruction was found to be the best solution.

To allow for varying site conditions and the fact that erection would sometimes have to be carried out in cramped conditions with a minimum of interference to traffic, a system of unit or component construction was adopted on a planning module of 40 in.

### Erection in Three Weeks

A building of the new type, which is in every way a permanent structure and introduces a new standard in design, can be erected complete with all main services in two months. The structure itself, less drains, water, and electricity, can be erected in three weeks. At embankment stations it is usual for a trainload of components, each one numbered, to be unloaded from train to platform by a rail crane during a week-end period.

As a first step, the structures are to be used in the modernisation of 11 stations between Crewe and Manchester, and seven stations between Crewe and Liverpool. Erection has already begun at East Didsbury, Heald Green and Burnage stations, on the Styal line.

## Staff and Labour Matters

### Railwaymen's Wage Claim

The Railway Staff National Tribunal will meet on March 17 to hear the claims of the three railway unions, the N.U.R., A.S.L.E.F., and T.S.S.A., for improved rates of pay for Railway salaried and conciliation staff.

### L.T.E. Busmen Threaten Overtime Ban

London busmen have threatened to ban overtime as a protest against the 4 per cent cut in schedules which is being introduced by the London Transport Executive for economic reasons.

The ban on overtime has been recommended by the Central Bus Committee of the Transport & General Workers Union and will now be considered by the London Busmen's Negotiating Committee which represents country services and trolleybus crews, besides those employed in Central London. If agreed, the ban will start at the end of March; but it is unlikely that a final decision will be taken before the men have considered the wage award which is expected from the Industrial Court very shortly.

The position was discussed by the union leaders on March 10, but a decision was deferred.

## Parliamentary Notes

### Railwaymen's Wages

Railway workers' wages were discussed in the debate on the Second Reading of the National Health Service (Contributions) Bill on March 5. Mr. William Shepherd (Cheadle—C.) said that a Labour Member had referred in a previous debate to railway workers as low-paid. Figures supplied by the B.T.C. showed that the ordinary station porter who was the lowest-paid man on the railway, received £9 5s. 5d. a week; a ticket collector received £11 1s. 1d. a week if at a barrier, and £11 16s. 2d. if on a train.

Several Members interjected that these figures were average and included overtime "and everything else."

Mr. Shepherd pointed out that he was concerned with earnings.

Several Labour Members queried the

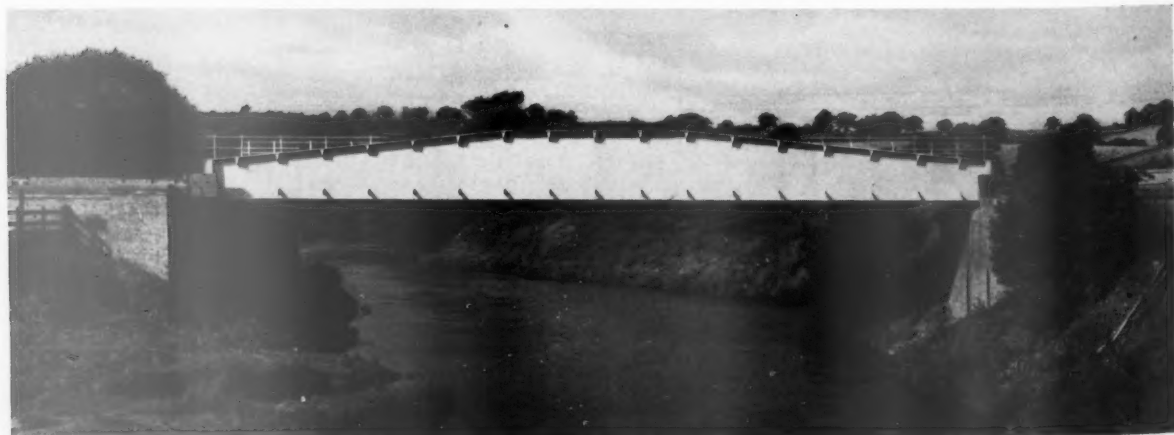
accuracy of the figures given and drew attention to Sunday work, overtime and other factors which increased earnings and made Mr. Shepherd's figures unreliable as a guide.

G. D. PETERS & CO. LTD. AGENCY.—G. D. Peters & Co. Ltd., Slough, Bucks, have been officially appointed as agents and distributors for Permasec flooring for use on road and rail transport vehicles. This product is made from completely impregnated densified wood to withstand severe mechanical, electrical, and chemical conditions.

BRUCE PEEBLES & CO. LTD.—Mr. S. A. Gaskell, Chairman of Bruce Peebles & Co. Ltd., in his circulated statement reports that orders received in 1957, as well as output, exceeded £3,000,000, the highest figure ever recorded. The value of orders in hand is in excess of the total at the end of 1956. Net profit for the year ended December 31, 1957, after providing for depreciation and taxation, is £205,169. Full provision has been made for all liabilities known and foreseeable at the end of 1957, and an ordinary dividend of 25 per cent and a bonus of 5 per cent is recommended.

RANSOMES & RAPIER AT MECHANICAL HANDLING EXHIBITION.—Examples of the range of machines manufactured by Ransomes & Rapier Limited of Ipswich, will be on show at the forthcoming Mechanical Handling Exhibition. This is to be held at Earls Court, London, on May 7-17. One of these will be the Rapier 4 Fast Standard mobile crane, which has a diesel engine, can be driven at the speed of normal road traffic. In its normal version it has a lifting capacity of 8,000 lb. at 4 ft. outreach giving a lift height of 14 ft.; alternatively it can lift 3,600 lb. at 10 ft. 4 in. outreach, lifting to 6 ft. Another exhibit will be a Rapier Super fork truck, designed for handling long loads, such as timber, steel sections and pipes in narrow gangways and through narrow doors. It has a carrying capacity of 12,000 lb. at 24 in. from the face of the forks.

## Half-Through Type Bridges with Prefabricated Steel Floors



Completed bridge over the River Severn near Pool Quay, British Railways, Western Region. The span is 93 ft. 6 in. between centre bearings; it was referred to in error as a 30-ft. span in the caption to the illustration on page 280 of our March 7 issue

## Contracts and Tenders

*Diesel engines, transmission units, and control equipment ordered from B.U.T.*

The British Transport Commission has placed orders to the value of some £325,000 with British United Traction Limited, for diesel engines, transmission units, and control equipment for installation in a further 62 light-alloy two-car multiple-unit diesel railcars to be built by British Railways Carriage & Wagon Works at Derby.

The equipment which includes twin B.U.T. 150-h.p. engines for the power cars is of a similar pattern to that fitted to approximately 700 power cars already in widespread service throughout the Eastern, North Eastern, London Midland, Scottish, and Western Regions of British Railways.

The London Transport Executive has placed a contract with Geo. W. King Limited for overhead cranes in the new strip and clean shop at Chiswick. The value of the contract is some £11,000.

British Railways, London Midland Region, have placed the following contracts:—

Taroards Limited, London, E.C.4: tarspraying and road repairs programme 1958, London District

Johnson Bros. (Aylesford) Ltd., Tonbridge, Kent: tarspraying and road repairs programme 1958, Northampton District

Modern Paviers Limited, Shipley, Yorks: tarspraying and road repair programme 1958, Derby North District

Taroards Limited, London, E.C.4: tarspraying and road repair 1958, Walsall District

Bosworth & Wakeford Limited, Rugby: reconstruction and lengthening of bridge No. 2 over Balmoral Road for the Watford Corporation, Watford Junction—St. Albans Abbey branch

Constable Hart & Co. Ltd., Richmond, Surrey: for tarspraying and road repair programme 1958, Derby South District

Modern Paviers Limited, Shipley, Yorks: tarspraying and road repair programme 1958, Manchester District

Johnson Bros. (Aylesford) Ltd., Tonbridge, Kent: tarspraying and road repair programme 1958, Blackburn District

Northern Taroards Limited, North Kendal, Westmorland: tarspraying and road repair programme 1958, Lancaster District

John Booth & Sons (Bolton) Ltd., Bolton: new bridge to carry the Carnforth-Wennington line, also occupation road over the north-south motorway, Lancaster by-pass at Carnforth Brow for the M.O.T., steelwork supply, fabrication, and delivery only

Norwest Construction Co. Ltd., Litherland, Liverpool, 21: modernisation of new stores building stage 2. M.P.D., Carlisle, Uppery

A. J. Binns Limited, London, N.1: fencing programme 1958, London District

Durafencing (Northern) Limited, Eccles, Manchester: fencing renewal programme 1958, Bangor District.

British Railways, North Eastern Region, have placed the following contracts:—

Lansing Bagnall Limited, Basingstoke: three stillage trucks and automatic wall charger, Faverdale Wagon Works

G. C. Hadden & Hillman Limited,

Newcastle: restoration of roofs over west end of carriage shed, Walkergate

T. E. Cundy & Son Ltd., Leicester: cleaning and painting press and old paint shop, Darlington Works

S. Platt Limited, Wednesbury: swaging and forging machine, horizontal forging machine, Darlington Loco. Works.

British Railways, Southern Region, have placed the following contracts:—

Piling & Construction Co. Ltd., Croydon, Surrey: piling and foundations, Yeovil Town

C. & T. Painters Limited, London, N.W.10: station renovations, Anerley

Taylor Woodrow Construction Limited, Southall, Middx: construction of five signalboxes and 14 relay rooms, extension of electrification, Kent Coast lines

J. M. Structures Limited, London, W.C.1: new staff accommodation, Herne Hill

Caffin & Co. Ltd., London, W.C.2: new staff accommodation, Tonbridge Motive Power Depot

Taylor Woodrow Construction Limited, Southall, Middx: new traffic shed, Woking

J. M. Structures Limited, London, W.C.1: staff accommodation, Barnes

Shirley Painting & Decorating Service, London, N.4: station renovations, Ashurst

The Walter Kidde Co. Ltd., Greenford, Middx: installation of automatic fire protection, Shepherds Lane Brixton and Beckenham Junction signalboxes.

The Special Register Information Service, Export Services Branch, Board of Trade, has received calls for tenders as follows:—

*From Formosa:*

10 diesel-electric locomotives, 1,300 to 1,400 b.h.p., with spare parts and maintenance tools.

The issuing authority and address to which bids should be sent is the Central Trust of China, Purchasing Department, 68, Yen Ping Nan Road, Taipei, Taiwan (Formosa). This purchase will be financed by the International Co-operation Administration (I.C.A.), the agency through which the United States Government gives economic and technical assistance to other countries. The closing date is April 5, 1958. The tender No. is 84-33-427-9-70389. Quotations should be made in U.S. dollars. The Board of Trade reference is ESB/6095/58/ICA.

*From Iraq:*

2 bogie second class non air-conditioned standard gauge coaches.

The issuing authority is the Director-General, Iraqi State Railways, Baghdad. The tender number is IRS/C/42/57. The closing date is May 31, 1958. Tenders must be accompanied by a deposit or guarantee of IDs. 1,800. Tender documents may be obtained by bona fide tenderers or their representatives from the Director-General of Railways, Baghdad West, on payment of a fee of IDs. 10 per set. This fee is not returnable. Although local representation is not essential, the Commercial Secretariat of the British Embassy in Baghdad suggests that if United Kingdom firms are in doubt about, or

unfamiliar with, local conditions they should arrange with a local agent to look after their interests. The names of Iraqi firms who have expressed willingness to act in this capacity can be obtained from the Board of Trade. The Board of Trade reference is ESB/5963/58.

*From South Africa:*

1 on-track 80-h.p. diesel-powered ballast tamping machine, four-wheel, 10 ton.

The issuing authority is the Stores Department, South African Railways. Bids in sealed envelopes, endorsed "Tender No. F.7214: Ballast Tamping Machine" should be addressed to the Chairman of the Tender Board, P.O. Box 7784, Johannesburg. The closing date is March 28, 1958. Preference will be given to tenders which offer a make of engine and compressor which has a well-established spares organisation in South Africa. The Board of Trade reference is ESB/6541/58.

*From Vietnam:*

22,788 rolled steel rails, standard type 30K 12m. length

562 rolled steel rails standard type 30K 11.975m. length

506 rolled steel rails, standard type 30K 11.957m. length

14 rolled steel rails, standard type 30K 11.936m. length

202,776 cast steel sleepers, standard type 30K

47,712 cast steel fish plates, standard type 30K.

The issuing authority and address to which bids should be sent is the Central Purchasing Authority, P.O. Box 280, Saigon, Vietnam. The tender No. is 30-33-095-9-70449. This purchase will be financed by the International Co-operation Administration (I.C.A.), the agency through which the United States Government gives economic and technical assistance to other countries. The closing date is April 23, 1958. The Board of Trade reference is ESB/5761/58/ICA.

Further details regarding the above tenders, together with photo-copies of tender documents, can be obtained from the Branch (Lacon House, Theobalds Road, W.C.1).

The Special Register Information Service, Export Services Branch, Board of Trade, has been advised that the Thai State Railways will call for tenders in the near future for the supply of three pre-fabricated steel bridges and 70 livestock wagons. No further information is at present available, but interested United Kingdom manufacturers are requested to send copies of their literature to the Head of the Stores Division, Mom Chao Voravirakorn Vorawan, Railways Organisation, Noppawongse Bridge, Bangkok.

**A.B.C. COUPLER & ENGINEERING RESULTS.**—The group trading profit for the year ended September 30, 1957, for the A.B.C. Coupler & Engineering Co. Ltd. was £150,066. This compares with £137,104 for the previous year. The net profit was £52,148 (£52,402) and the dividend was 20 per cent (20 per cent). Current assets are £630,251 (£716,947) and reserves £379,966 (£334,023).

## Notes and News

**Rain Halts Sydney Underground Trains.**—More than 12 in. of rain which fell non-stop in the Sydney area last weekend, put the entire City Underground Railway out of action.

**Colonel R. J. Walker in East Africa.**—Colonel R. J. Walker, a Director of the Benguela Railway Company, took advantage of a stop in Nairobi whilst flying from Lisbon to Lobito to tour some installations of East African Railways & Harbours. He is seen in the accompanying illustration with Mr. W. E. Bulman, Assistant Chief Mechanical Engineer (Technical) E.A.R. & H. (left) and Mr. N. F. Stevens, the Assistant Chief Mechanical Engineer (Works) (centre), examining the driving wheels of a locomotive in the mechanical workshops.



Colonel R. J. Walker examining a driving wheel during his visit to the East African Railways & Harbours mechanical workshops at Nairobi

**Indian State Railways Reunion and Dinner, 1958.**—The annual reunion tea and dinner of the Indian State Railways (India and Pakistan) will be held on June 27, at the Rembrandt Hotel, Thurloe Place, S.W.7. The chair at the dinner will be taken by Sir Robert Marriott, formerly General Manager of the East Indian Railway, and the principal speaker will be Mr. T. T. Lambe, a partner of Messrs. Rendel, Palmer & Tritton, and formerly Deputy Chief Mechanical Engineer (Works & Maintenance), East Indian Railway. The charge for the dinner will be 21s. and that for the tea 4s. Application for tickets should be made before June 20 to Mr. N. Calder, 16, St. James's Square, London, S.W.1.

**New Diesel Service in the West Riding.**—To inaugurate the diesel train services in the North Eastern Region of British Railways between Leeds and Barnsley on March 3 a demonstration run was made for the special party. Members of this are shown in the accompanying illustration: (left to right) Mr. Albert Roberts, M.P. for Normanton; Mr. H. A. Short, General Manager, North Eastern Region; Councillor M. S. Fitzpatrick, Mayor of Wakefield; Mr. R. B. Temple, Traffic Manager, British

Railways, Eastern Region, Sheffield; Councillor S. Jubb, Mayor of Barnsley; and Driver N. Barratt. The trains working these services are three-car sets built by the Metropolitan-Cammell Carriage & Wagon Co. Ltd.

**Institute of Transport Annual Dinner.**—The principal guests at the annual dinner of the Institute of Transport, to be held at the Dorchester Hotel, Park Lane, London, W.1, on March 21, will be Mr. Harold Watkinson, Minister of Transport & Civil Aviation, and Lord Pakenham.

**Associated Electrical Industries Limited.**—At a meeting of the board of Associated Electrical Industries Limited on March 4, 1958, it was resolved to recommend a final dividend on the ordinary stock of 7½ per cent less tax, to be paid on April 15 in respect of the financial year ended December 31, 1957. The total amount, less tax, is £1,450,703. The dividend now recommended is in respect of

£33,639,483 issued ordinary stock. Quarterly interim dividends totalling 7½ per cent for the year, less tax, have already been paid on the same stock. If the proposed final dividend is approved, the total distribution on the ordinary stock for the year 1957 will be 15 per cent (the same rate as last year) payable for the full year on the total issued ordinary capital.

**Coil Spring Federation Research Organisation Annual Conference.**—The annual conference of the Coil Spring Federation Research Organisation will be held at the Imperial Hotel, Torquay, from June 5 to 8, 1958. The business meetings will be held on the morning of June 6, and a technical session on the morning of June 7.

**Lewisham Accident Driver in Court.**—Driver W. Trew, who was in charge of the steam train involved in the Lewisham accident on December 4, appeared at Greenwich police court on March 9, on a summons alleging manslaughter. Counsel for the Crown, Mr. Christmas Humphreys, outlined the case against him. The hearing was adjourned to March 25.

**More Colour-Light Signals in Southern Region Suburban Area.**—Work has begun on installing automatic colour-light signalling between Clapham Junction and Richmond, Southern Region. This will replace the existing semaphore signals. With the new signalling the headway between fast trains can be reduced to 2 min., and to 2½ min. for stopping trains. One new box at Barnes will replace three existing boxes.

**Withdrawal of Services Between Loftus and Whitby West Cliff.**—British Railways, North Eastern Region, announce that, because of the financial loss being incurred, it has now become necessary to close the section of line between Loftus and Whitby West Cliff. From May 5 railway facilities will be withdrawn. The stations closed will be Staithes, Hinderwell, Kettlewell, and Sandsend. This course has been approved by the Transport Users' Consultative Committee for the North Eastern Area and also by the Central Transport Consultative Committee. Concurrently with the closing of the line, an augmented service of diesel trains between Middlesbrough and Whitby



Mr. H. A. Short, General Manager of the North Eastern Region, with members of the special party at the inauguration of the Leeds-Barnsley diesel service

via the Esk Valley route will be brought into operation. There will also be a service of diesel trains operating between Middlesbrough and Loftus. Bus services, operated by the United Automobile Services Limited, serve the intermediate points between Loftus and Whitby. For parcels and freight traffic, alternative facilities will be provided by road services operating from Whitby and Loftus.

**Metropolitan-Vickers Sheffield Office.**—The Metropolitan-Vickers Electrical Co. Ltd. announces that from March 24 the postal address of the company's Sheffield district office will be Metropolitan-Vickers Electrical Co. Ltd., 9, Market Place, Sheffield 1. The telephone numbers, Sheffield 23114-5-6-7 and 27848 will remain unchanged.

**Office Mechanisation Exhibition at Paddington.**—The accompanying illustration shows Mr. John Ryan, Member of the Western Area Board, opening the recent Office Mechanisation Exhibition in the Board Room and adjacent committee room at Paddington. The exhibition was organised by the Western Region Standing Committee on Office Mechanisation and was visited by officers and senior staff from many offices and installations in the Region. Items shown included adding and calculating machines, charting systems, collating machines, microfilming equipment, money checking and issuing machines, photo-composing and photocopying machines. The group shows (left to right): Messrs. C. J. Rider, Public Relations & Publicity Officer; S. F. Cox, Assistant Regional Accountant; P. Armstrong, Assistant Establishment & Staff Officer; H. G. Bowles, Assistant General Manager (Administration); A. W. J. Dymond, Stores Superintendent; K. W. C. Grand, General Manager; J. W. J. Webb, Regional Accountant; John Ryan, M. G. R. Smith, Chief Civil Engineer; H. E. A. White, Running & Maintenance Officer; R. G. Henbest, Estate & Rating Surveyor; A. W. Woodbridge, Signal

Engineer; A. H. Curtis Welch, Secretary, Western Area Board; C. W. Powell, Operating Officer; P. F. Grant, Senior Assistant to Regional Accountant; S. G. Ward, Regional Establishment & Staff Officer; and R. A. Smeddle, Chief Mechanical & Electrical Engineer.

**Potteries Motor Traction Results.**—A final dividend of 5 per cent, making 10 per cent for 1957, as for the previous year, has been declared by the Potteries Motor Traction Co. Ltd., a subsidiary of the British Electric Traction Co. Ltd.

**Keith Blackman Limited at Factory Equipment Exhibition.**—A selection of the various types and sizes of Tornado fan equipment manufactured by Keith Blackman Limited, of Tottenham, London, will be displayed on the company's stand at the forthcoming Factory Equipment Exhibition. This will be held at Earls Court, London, on April 14-19. The emphasis of the demonstration will be many fans and blowers which are always available from stock.

**Tin Research Institute Annual Report, 1957.**—The report of last year's work of the Tin Research Institute indicates that all departments were actively engaged in developing fresh applications of the metal. Among the developments which are likely to have direct or indirect application to railways is a method of producing electroplated deposits of tin in a fully bright form. This can be used for electrical and signalling equipment. The invention by the Institute of a method of bonding aluminium-tin bearing alloys to steel has now reached the commercial stage of development for locomotive diesel engine bearings. An improved cast iron has been shown to be obtained if small amounts of tin are added. Also, organotin compounds have been investigated for a variety of purposes during the year. One likely application appears to be for rolling stock construction, these substances being fungi-

cide in character, possibly being embodied in woodwork preservatives or paints.

**New Approach Urged to Wage Negotiations.**—Changes in the methods of wage negotiation and arbitration procedure were advocated earlier this week by Mr. D. M. Sinclair, General Manager of the Birmingham & Midland Motor Omnibus Co. Ltd., in addressing the Institute of Transport on "Relations in Industry." It was time, he maintained, for trade unions to stop demanding at least twice what they are prepared to accept; employers should stop offering about half of what they are prepared to concede. This does not make very good sense now. It was also one of the reasons why arbitration tribunals could get so many disputes settled, without giving explanations for their awards, "merely by splitting the difference." He made two concrete proposals for improving industrial relations—widening differentials to promote responsibility in the supervisory grades, and the issue to each employee of his company's balance sheet with an explanatory brochure.

**Inquiry into Road Haulage.**—The Minister of Transport & Civil Aviation, Mr. Harold Watkinson, has decided to carry out a sample investigation into the use made of road goods vehicles. About 8,000 vehicles, representing a cross-section of existing fleets, including B.T.C. vehicles, will be picked at random. Operators of those selected will be asked to send the Ministry a form giving details of each vehicle and its movements during the seven days beginning April 21. Other information asked for will include the nature of the goods carried, maximum load during each journey, number of miles run (loaded over half capacity, loaded only half capacity or less, and empty) and where journeys started and ended. Since an earlier investigation in September, 1952, over 250,000 additional vehicles have been brought into use, the British Road Services fleet has been considerably reduced and restrictions on the use of non-nationalised vehicles have been lifted. The new survey is designed to find out the effect of these changes and to facilitate an appreciation of the developments in the road freight transport system.

## Forthcoming Meetings

March 17 (Mon.).—Railway Correspondence & Travel Society, Merseyside Branch, at the Woodside Hotel, Birkenhead, at 7.30 p.m. Paper on "The last days of steam in Ireland," by Mr. D. S. Smith.

March 18 (Tue.).—Institution of Civil Engineers, at Great George Street, Westminster, S.W.1, at 5.30 p.m. James Forrest Lecture by Sir John Cockcroft.

March 19 (Wed.).—Institution of Locomotive Engineers, at the Institution of Mechanical Engineers, 1, Birdcage Walk, London, S.W.1, at 5.30 p.m. Annual General Meeting followed by a paper on "Fuels and injection equipment for traction diesel engines," by Messrs. H. A. Gill and J. M. Smith.

March 19 (Wed.).—British Railways (Southern Region) Lecture & Debating Society at the Chapter House, St. Thomas' Street, London, S.E.1, at 6 p.m. Reading of prize essay and annual general meeting.



Mr. John Ryan, Mr. K. W. C. Grand, and officers of the Western Region at the Office Mechanisation Exhibition in the Board Room at Paddington

- March 19 (Wed.).—Permanent Way Institution, London Section, at the Headquarters of the British Transport Commission, 222, Marylebone Road, London, N.W.1, at 6.30 p.m. Paper on "Modern trends in tunnelling practice," illustrated by lantern slides, by Mr. J. Kell.
- March 20 (Thu.).—Diesel Engineers & Users Association, at Caxton Hall, Westminster, S.W.1, at 2.30 p.m. Paper on "Governing of diesel engines," by Mr. R. A. Fuller.
- March 20 (Thu.).—Institution of Mechanical Engineers, at 1, Birdcage Walk, London, S.W.1, at 6 p.m. Discussion, "How to bridge the gap between theory and practice in lubrication."
- March 21 (Fri.).—Institution of Mechanical Engineers, at 1, Birdcage Walk, London, S.W.1, at 6 p.m. James Clayton Lecture on "High-speed high-performance diesel engines: their development and application," by Dr. Ekhardt Schmidt.
- March 21 (Fri.).—Institute of Transport, at the Dorchester Hotel, Park Lane, London, W.1, at 6.45 for 7.30 p.m. Annual dinner.
- March 21 (Fri.).—Crewe Pupils & Apprentices Association, at the Royal Automobile Club, Pall Mall, London, S.W.1. The 51st dinner.
- March 21 (Fri.).—Electric Railway Society, Birmingham, at the Exchange & Engineering Centre (adjoining New Street Station) at 7.15 p.m. Film show by Mr. W. J. Wyse, "Around Switzerland by train."
- March 22 (Sat.).—Permanent Way Institution, Manchester & Liverpool Section, at the College of Technology, Sackville Street, Manchester, at 2.30 p.m. Paper on "Effects on permanent way to be expected from general introduction of diesels and electrification," by Mr. J. C. Loach.
- March 25 (Tue.).—Railway Correspondence & Travel Society, East Midlands Branch, at the N.C.S. Guild Room, Toll Street, Nottingham, at 7.30 p.m. Paper on "Half-a-century of Midland performance," by Mr. J. F. Clay.
- March 25 (Tue.).—Railway Correspondence & Travel Society, West Midlands Branch, at 64, Holyhead Road, Coventry, at 7.30 p.m. Paper by Mr. R. Bugler on "The development of 25 kV."
- March 27 (Thu.).—British Railways (Western Region) London Lecture & Debating Society, at Headquarters Staff Dining Club, Bishop's Bridge Road, Paddington, W.2, at 5.45 p.m. Young men's discussion "The means by which British Railways can be made to pay their way," preceded by the annual general meeting.
- March 28 (Fri.).—Institution of Railway Signal Engineers, Bristol Section, at Westinghouse Brake & Signal Company's works, Chippenham, at 5.45 p.m. Paper on "Intermediate block section signalling," by Mr. H. Du Tabor.
- March 28 (Fri.).—Institution of Locomotive Engineers. Visit to the works of Westinghouse Brake & Signalling Co. Ltd., Chippenham. Members leave Paddington Station by 11.5 a.m. train.
- March 29 (Sat.).—Permanent Way Institution, East Anglia Section, at Ipswich, at 2.15 p.m. Paper on "Ordnance surveys," illustrated by lantern slides, by Major P. C. Sherwood.

## Railway Stock Market

A better tendency continued in stock markets, where a moderate improvement in demand has disclosed shortage of shares. If demand persists, prices could rise substantially in these circumstances, but although buyers are now more in evidence, there is still considerable caution. Nevertheless, the view appears to be gaining ground that the heavy fall in share values this year may have been carried too far. Many of the financial results are better than had been generally expected, particularly as they include dividend increases which seem to suggest confidence in the outlook. More hopeful views are also developing regarding the Budget. The better trend on Wall Street has also assisted sentiment, though there are conflicting opinions whether the slow-down in U.S.A. business activity will halt unless more comprehensive measures to stimulate industry are taken by President Eisenhower.

The improvement in stock markets has not developed sufficiently to extend to railway securities, but in general they had a firmer appearance. Canadian Pacifics, for instance, have risen on balance from \$44½ a week ago to \$46½, while the 4 per cent preference stock and debentures were also better at 54½ and 65 respectively. White Pass rallied from \$12½ to \$15½, and elsewhere, Peru Transport \$1 shares were again quoted at \$½.

In other directions, Antofagasta ordinary stock was firmer again at 15½, with the preference stock little changed at 35, and the 5 per cent (Bolivia) debentures were 93.

United of Havana second income stock improved from 5½ to 6, but the consolidated stock remained at 1½. Paraguay Central prior debentures were again quoted at 12, and Guayaquil & Quito assented stock remained at 70½. International of Central America common shares eased to \$19½, but Chilean Northern debentures gained half-a-point at 35. Moreover, Costa Rica ordinary stock held steady at 17½, while the 6½ per cent second debentures were 89½. Brazil Railway bonds were quoted at 5½, but in general very little business has passed in foreign rails. Mexican Central "A" bearer debentures changed hands around 66½; San Paulo Railway 3s. units have remained at 2s. 1½d. Nyasaland Railways shares remained at 9s. 9d. and the 3½ per cent debentures at 60½.

Hurst Nelson have risen further from 33s. 3d. a week ago to 34s. 9d. on further consideration of the take-over offer terms from Charles Roberts. The 5s. shares of the last-named were firm at 8s. 4½d. The board of Hurst Nelson proposes to accept the offer, which is conditional on not less than 90 per cent acceptance or such lesser percentage of not less than 70 per cent as may be agreed. Beyer Peacock 5s. shares have changed hands around 7s. 1½d. and in other directions, Dowty Group 10s shares remained under the influence of the higher interim dividend and progress report and rose to 34s. Wagon Repairs 5s. shares were 11s. 3d. and Gloucester Wagon 10s. shares 13s. 9d., while North British Locomotive strengthened to 10s. 3d. and Birmingham Wagon were 16s. 7½d.

In response to the financial results, Associated Electrical rose from 48s. 3d. to 50s. 9d. Moreover, General Electric have improved from 30s. 3d. to 31s., Crompton Parkinson 5s. shares firmed up from 8s. 6d. to 9s., and English Electric were 51s. 9d., compared with 47s. 6d. a week ago. Pressed Steel 5s. shares were 13s. 9d., Leyland Motors 40s. 10½d., British Timken 47s.,

Ransomes & Marles 5s. shares again 9s. 6d. while T. W. Ward moved higher at 73s. 6d. Ruston & Hornsby, too, moved higher at 24s. 6d. Babcock & Wilcox at 46s. 6d. have responded strongly to the better trend in stock markets.

## OFFICIAL NOTICES

**DRAUGHTSMAN** required for London Office, preferably with previous experience in Diesel Rail Traction, but knowledge of Diesel Engine and heavy transmission installations essential. Five-day week, luncheon vouchers and pension scheme available. Apply in writing stating experience to Box 559, Railway Gazette, 33 Tothill Street, London, S.W.1.

**LONDON TRANSPORT** require **JUNIOR ASSISTANT** to be responsible to the Signal Engineer for technical design work on telephone system and train describers used on London Transport. Applicants should have knowledge of automatic telephony and some knowledge of carrier wave working. Technical qualifications not less than Higher National Certificate (Electrical Engineering). Salary range £1,210 to £1,420. Medical examination; free travel. Applications within 7 days to Staff and Welfare Officer (F/EV674), London Transport, 55 Broadway, S.W.1.

**TELEGRAPH ASSISTANT.** East African Railways and Harbours Administration. To be responsible to the Signal and Telegraph Engineer for the installation and maintenance of all signalling and telegraph apparatus. Pensionable appointment in the salary range £1,170 to £1,755 per annum gross. Free passages for the officer, his wife and family; free furnished quarters if available. Free medical, but not dental attention. Generous leave. Candidates, between 25 and 35 years of age, must be A.M.I.R.S.E. and have thorough experience of telecommunication systems associated with Railways, and in particular single and double line Blocks, Traffic Control Telephone, and Telegraph systems. Capable of designing, estimating and controlling the maintenance organisation associated with such installations. Knowledge of mechanical and power signalling systems and radio systems an advantage. Write, Director of Recruitment, Colonial Office, S.W.1, stating age, qualifications and experience. Quote BCD 173/053.

**TYNE IMPROVEMENT COMMISSION.** The Tyne Improvement Commissioners invite applications from qualified persons for the positions of (a) ASSISTANT CHIEF ENGINEER and (b) SENIOR ASSISTANT ENGINEER under their Chief Engineer, Mr. R. B. Porter, M.I.C.E. Applicants for each position must be Chartered Civil Engineers with extensive experience in the design, construction and maintenance of dock and harbour works and installations. The commencing salary, which will have regard to the qualifications and experience of the successful candidate, will be for the position of Assistant Chief Engineer not less than £2,100 per annum for the position of Senior Assistant Engineer not less than £1,650 per annum. Applicants must not be less than 32 years of age nor more than 45 years of age on the 1st January, 1958. The person appointed will be subject to the provisions of the Commissioners' Superannuation Scheme; will be required to reside in the district and to devote himself exclusively to the service of the Commissioners. Applications on a prescribed form, copies of which may be obtained from the undersigned, will be received up to the 10th April, 1958, and should be addressed to the Secretary endorsed to indicate the position for which application is made. Canvassing will be a disqualification. R. N. Eggleton, Secretary, Bewick Street, Newcastle-upon-Tyne, 1.

**THE** Proprietors of British Patent No. 701,483 are prepared to sell the Patent or to license British manufacturers to work thereunder. It relates to "Improvements in or relating to Articulated Railway Vehicles." Address: Boulton, Wade & Tennant, 112 Hatton Garden, London, E.C.1.

**DIRECTOR GENERAL.** India Store Department, Government Building, Bromyard Avenue, Acton, London, W.3, on behalf of Ministry of Railways, Railway Board, New Delhi, invites tenders for 146 Nos. SINGLE LINE TOKENLESS LOG AND BUS INSTRUMENTS. Delivery required 6 to 12 months. In addition to the above, firms may also furnish particulars of Modified Tokenless Instruments, which can be used in conjunction with Wheel Counters with quotations of this complete equipment. Forms of tender list GP13 1957/58 may be obtained on application from the above address quoting reference S.5249/57/CDN/FD and enclosing fee of 2s. (not refundable). Firms' offers should reach New Delhi not later than 22nd April, 1958.

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